

EXHIBIT A

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA**

IN RE: CATHODE RAY TUBE (CRT)
ANTITRUST LITIGATION

MDL No. 1917

Master File No. C-07-5944 JST

THIS DOCUMENT RELATES TO:

*Crago, d/b/a Dash Computers, Inc., et al. v.
Mitsubishi Electric Corporation, et al., Case
No. 14-CV-2058 JST*

EXPERT REPORT OF LESLIE M. MARX, PHD

September 1, 2016

HIGHLY CONFIDENTIAL SUBJECT TO PROTECTIVE ORDER

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I. Introduction

I.A. Qualifications

- (1) I am the Robert A. Bandeen Professor of Economics at the Fuqua School of Business at Duke University. In addition, I am a Partner at Bates White Economic Consulting (Bates White), a professional services firm that performs economic and statistical analysis in a variety of industries and forums. I specialize in microeconomics, particularly the fields of industrial organization and applied game theory, with a research focus on collusion, auctions, and procurements. I received my PhD in Economics from Northwestern University, and my BS in Mathematics from Duke University, where I graduated summa cum laude and was the valedictorian.
- (2) Prior to joining the faculty at the Fuqua School of Business in 2002, I was an Associate Professor of Economics and Management at the W.E. Simon Graduate School of Business Administration at the University of Rochester. I spent 2005–2006 as the Chief Economist for the Federal Communications Commission. I have taught graduate-level (i.e., PhD) courses in game theory and industrial organization, and I have taught courses to MBA students on managerial decision analysis, managerial economics, managerial game theory, and environmental economics.
- (3) Throughout my career, I have pursued a research program focusing on auctions, procurement, cartels, and collusive behavior. My research incorporates my training in economic theory and econometrics. I have authored papers in many areas relevant to antitrust analysis, including papers examining the conduct of the Vitamins cartel, papers related to collusion at auctions, and papers on coordinated effects related to merger analysis. These and other of my professional papers have been published in peer-reviewed publications such as *Journal of Political Economy*, *American Economic Review*, *Quarterly Journal of Economics*, *Journal of Economic Theory*, and *Games and Economic Behavior*. I am also co-author of a book on the economics of collusion entitled *The Economics of Collusion: Cartels and Bidding Rings*, published in 2012 by MIT Press. I have received funding from the National Science Foundation and received an Emerging Scholar Program Grant from the American Compensation Association.
- (4) In addition to my teaching responsibilities at Duke University, I have been involved in the education of U.S. judges on antitrust economics. I have twice been paired with another economist to teach the sessions on “Cartels” and “Agreement and Facilitation Practices” at the Antitrust Law & Economics Institute for Judges, co-sponsored by the ABA Section of Antitrust Law and the Law & Economics Center at George Mason University School of Law.

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- (5) My sworn testimony over the last five years is as follows:
- *In re Urethane Antitrust Litig.*, MDL No. 04-1616 (D. Kan. filed 2004). Expert report, deposition, and trial testimony: 2013–2016.
 - *Anderson News v. American Media, Inc.*, No. 09-cv-2227 (S.D.N.Y. filed 2009). Expert reports and deposition testimony: 2014.
 - *In re Petition of Pandora Media, Inc.*, No. 12-cv-8035 (S.D.N.Y. filed 2013). Expert reports and declaration, deposition, and trial testimony: 2013–2014.
 - *In re TFT-LCD (Flat Panel) Antitrust Litig.*, MDL No. 07-1827 (N.D. Cal. filed 2007). Expert reports and deposition testimony: 2011–2014.
- (6) In addition to my prior testimony, I have provided consulting support on numerous plaintiff and defense antitrust matters, and I have extensive experience employing economic analysis similar to the analysis I performed in this case. Additional information about my professional experience, including publications and affiliations, can be found on my curriculum vitae, attached as Appendix A.
- (7) Bates White is compensated at a rate of \$950 per hour for my work in this matter. Neither Bates White's nor my compensation is in any way contingent on the outcome of this case.

I.B. Scope of charge

- (8) I have been retained by attorneys for the Class of Direct Purchaser Plaintiffs in this matter. The class plaintiffs allege that the defendants and their co-conspirators (hereafter the Alleged Co-conspirators or Co-conspirators)¹ engaged in a conspiracy to fix the price of cathode ray tubes (CRTs) between March 1, 1995, and November 25, 2007 (the Class Period). I have been asked to offer my professional opinion as to whether the economic evidence during the Class Period is consistent with coordinated conduct by the Alleged Co-conspirators, including Mitsubishi Electric Corporation (Mitsubishi), and inconsistent with their unilateral self-interest.

I.C. Materials relied on

- (9) In preparing this report, I was assisted by a staff of expert economists and economic analysts at Bates White. While engaged in this matter, I directed the activities of the team, made all final decisions concerning the methods and their implementation, and prepared this report.

¹ Throughout this report, I will refer to the CRT manufacturers that have been named as either a defendant or a co-conspirator in the DPP's Second Amended Complaint (filed Aug. 6, 2015) as Alleged Co-conspirators, or more simply Co-conspirators to minimize excess verbiage. A list of the Alleged Co-conspirators is included in Section II.A.1.

- (10) My support team and I were provided with access to documents and materials produced by the plaintiffs and defendants in this matter and by other parties and transcripts of depositions taken in this matter. I also had access to the expert reports submitted earlier in the MDL proceedings in this case. In directing my support team, I emphasized the importance of identifying documents for my review regardless of whether they were favorable to the positions of the plaintiffs or defendants.
- (11) In forming my opinions in this matter, I consider myself to have relied upon—in addition to my training and experience—the materials and analyses identified in this report and those listed in Appendix B. This set is intended to be consistent with the Order re Procedures Governing Expert Discovery, *In Re Cathode Ray Tube (CRT) Antitrust Litigation*, Master File No. M-07-5944, MDL No. 1917 (N.D.Ca. November 17, 2009, docket entry #583). Generally, I understand that discovery remains ongoing, and I reserve the right to incorporate into my analysis new information or data, should it become available.

I.D. Summary of opinions

- (12) Based on my analysis, I conclude that the economic evidence during the Class Period is consistent with coordinated conduct by the Alleged Co-conspirators (Chunghwa, Hitachi, IRICO, LG Electronics, LPD, Philips, Panasonic (Matsushita), Mitsubishi, MTPD, Orion, Samsung SDI, Thai CRT, Thomson, and Toshiba)² and that their conduct is inconsistent with their unilateral self-interest. I have also specifically considered Mitsubishi's conduct, which I find to be consistent with its participation in a cartel and inconsistent with its unilateral self-interest.
- (13) The structure of the CRT industry is consistent with effective collusion. The Co-conspirators controlled a large share (more than 85%) of the CRT market. There were barriers to entry that would have prevented suppliers from either expanding production or adding production capacity. Several of the Co-conspirators have been implicated for collusive behavior in other industries.
- (14) The cartel structures and conduct are consistent with the economics literature's view of effective cartels and with effective cartels in other products. The Co-conspirators, including Mitsubishi, exchanged competitively sensitive information on current prices, future prices, current production levels, future production, and other strategic information with one another. This included discussions between Co-conspirators about targeted price increases, "bottom" or "floor" prices to charge, prices to be charged to specific customers, and decisions to reduce production and postpone expansion of production. Some of these exchanges of competitively sensitive information took place at the so-called "glass meetings," but many similar exchanges of information in furtherance of the cartel took place separately from the glass meetings. These types of information exchanges are recognized by the

² See Section II.A.1.

economics literature as pro-collusive and not enhancing efficiency (i.e., are not pro-competitive). Consistent with this, government antitrust enforcers have stated that the types of information exchanged in this matter are “more likely” to raise concerns about their anti-competitive impact. The Co-conspirators’ conduct is consistent with their admissions to having participated in a cartel and findings by governmental authorities around the world that they participated in collusive behavior.

- (15) The Co-conspirators also allocated market shares, customers, and geographic areas among themselves in a manner consistent with the economics literature on cartels. In addition to discussions about pricing and production as noted above, the Co-conspirators used their meetings and other communications to monitor one another’s conduct and address disagreements among themselves when they arose. They also allowed one another to visit and “audit” each other’s production facilities to demonstrate compliance.
- (16) The effective suppression of inter-firm rivalry was in the Co-conspirators’ collective interest, and the Co-conspirators themselves commented on the benefits of their collusive conduct. In addition, the Co-conspirators recognized their conduct and created a legal risk associated with violating the antitrust laws. Still, the Co-conspirators continued to meet, exchange information, and discuss prices and production levels over a more than a decade. This is contrary to what an economist would expect if the Co-conspirators did not perceive their conduct to be effective. In other words, I expect that the prices charged by the cartel were elevated relative to what they would have been absent the cartel.”

II. Industry background and structure

II.A. CRTs overview

- (17) Cathode ray tubes, commonly referred to as CRTs, are used to produce displays of text and images in computer monitors and televisions. CRTs create the text and images visible on a screen by illuminating chemical particles.³ Three main components make up a CRT: a phosphor-coated screen, an electron gun, and a deflection yoke. An electron gun contains the cathode, a heated filament, that sends a beam of electrons onto the phosphor-coated screen. The electrons hit the screen—the backside of the glass a viewer sees on a monitor or television—illuminating the particles that it hits.⁴ This is what is referred to as the “cathode ray.” The last component, the deflection yoke, is made up of copper windings located between the electron gun and phosphor-coated screen.⁵ The deflection yoke directs the cathode rays so they illuminate the particles in the correct pattern of the images and text seen on the screen.⁶
- (18) There are two types of CRTs: color picture tubes (CPTs) and color display tubes (CDTs). CPTs are primarily used in televisions, which prioritize brightness over resolution because they display moving images that are often viewed from a distance.⁷ CDTs are primarily used in computer monitors, which prioritize resolution because they display numerical data and text that are often viewed up close.⁸
- (19) CRTs come in a range of product types based on different physical features. CRTs can be sold either with or without the deflection yoke. A CRT without a deflection yoke is referred to as a “bare tube,” while a CRT with a deflection yoke is referred to as an “integrated tube and component,” or ITC.⁹ CRTs come in a range of screen sizes, anywhere from 6" to 42", as measured across the diagonal

³ 30(b)(6) Deposition of Thomas Heiser (Hitachi) at 43, July 3, 2012 (Heiser (Hitachi) Deposition); Office of Industries, US International Trade Commission, “Industry & Trade Summary: Television Picture Tubes and Other Cathode-Ray Tubes,” USITC Publication 2877, May 1995, p. 1.

⁴ 30(b)(6) Deposition of Tatsuo Tobinaga (Panasonic) at 43-4, July 16-17, 2012 (Tobinaga (Panasonic) Deposition); Office of Industries, US International Trade Commission, “Industry & Trade Summary: Television Picture Tubes and Other Cathode-Ray Tubes,” USITC Publication 2877, May 1995, p. 1.

⁵ Office of Industries, U.S. International Trade Commission, “Industry & Trade Summary: Television Picture Tubes and Other Cathode-Ray Tubes,” USITC Publication 2877, May 1995, p. 1, Figure 2; M.I.T. Radiation Laboratory Series, “Cathode Ray Tube Displays,” Volume 22, McGraw-Hill Book Company, Inc. (1948), p. 3, (<http://www.jlab.org/ir/MITSeries/V22.PDF>); Marshall Brain, “How Television Works,” 11/26/2006, (<http://electronics.howstuffworks.com/tv.htm>).

⁶ 30(b)(6) Deposition of Jae In Lee (SDI) at 76, June 6-7, 2012 (Jae In Lee (Samsung SDI) Deposition (2012)); Marshall Brain, “How Television Works,” 11/26/2006, (<http://electronics.howstuffworks.com/tv.htm>).; Heiser (Hitachi) Deposition at 43.

⁷ SDCRT-0021278 (Exhibit 153).

⁸ Tobinaga (Panasonic) Deposition at 142-3.

⁹ Heiser (Hitachi) Deposition at 44; 30(b)(6) Deposition of Nobuhiko Kobayashi (Hitachi), July 17, 2012 at 21-2 (Kobayashi (Hitachi) Deposition).

length of the screen.¹⁰ As CRT technology developed, CRT manufacturers shifted from manufacturing CRT screens that were slightly curved to those that were flat, in order to compete against flat panel displays that were entering the market.¹¹ CRTs could be manufactured with different features, but the differences are common and standard across manufacturers.¹²

- (20) A key feature of the demand for CRTs is that it is a derived demand. That is, the demand for CRTs fluctuates based on the demand for the products that incorporate CRTs. In the 1990s, for example, personal computers started becoming a fixture of the average household and business office.¹³ The demand for CRTs increased as the demand for personal computers increased.
- (21) By the early 2000s, the CRT industry recognized that the demand for its product was going to decline.¹⁴ Televisions and computer monitors moved away from CRT technology in favor of the smaller and thinner flat panel displays, including liquid crystal displays (LCDs). Compared to CRTs, LCDs consume less power, generate less heat, and reduce eyestrain for the viewer through greater contrast capabilities.¹⁵ Figure 1 and Figure 2 show the change in CRT consumption over time prior to and once LCDs and other flat panel display technologies became more common.

¹⁰ Jae In Lee (Samsung SDI) Deposition (2012) at 77-8; SDCRT-0021278, Exhibit 153E.

¹¹ Heiser (Hitachi) Deposition at 52-4; 30(b)(6) Deposition of Roger De Moor (Philips) at 47-52, July 31, 2012 – August 1, 2012.

¹² Deposition of C.C. Liu (Chunghwa), February 19-21, 2013 (C.C. Liu (Chunghwa) Deposition), at 298-300.

Q: With respect to CDT tubes, color display tubes, monitors for – what will be used for monitors in computers. Do you have an understanding as to whether the tubes, CDT tubes are sufficiently standardized so that monitor manufacturers can use CDT tubes from any manufacturer – major manufacturers?

A: Yes, considerably standardize, I know.

Q: With respect to CPT, color picture tubes, do you have an understanding as to whether the color picture tubes for sale to manufacturers of color -- to people who manufacture or companies that will manufacture color televisions for use in the Northern Hemisphere are sufficiently standardized so that a TV manufacturer who wishes to manufacture televisions for sale in the Northern Hemisphere, can use color picture tubes from any of the major manufacturers?

A: I understand what you said. For Northern Hemisphere use the color picture tubes can be used interchangeably right at the beginning, probably because of differences of magnetic use, there were some differences between the North Hemisphere and the South Hemisphere. However, in later stage the image tubes can be adjusted, so there were no other - or there have been no much difference so they interchangeably use.

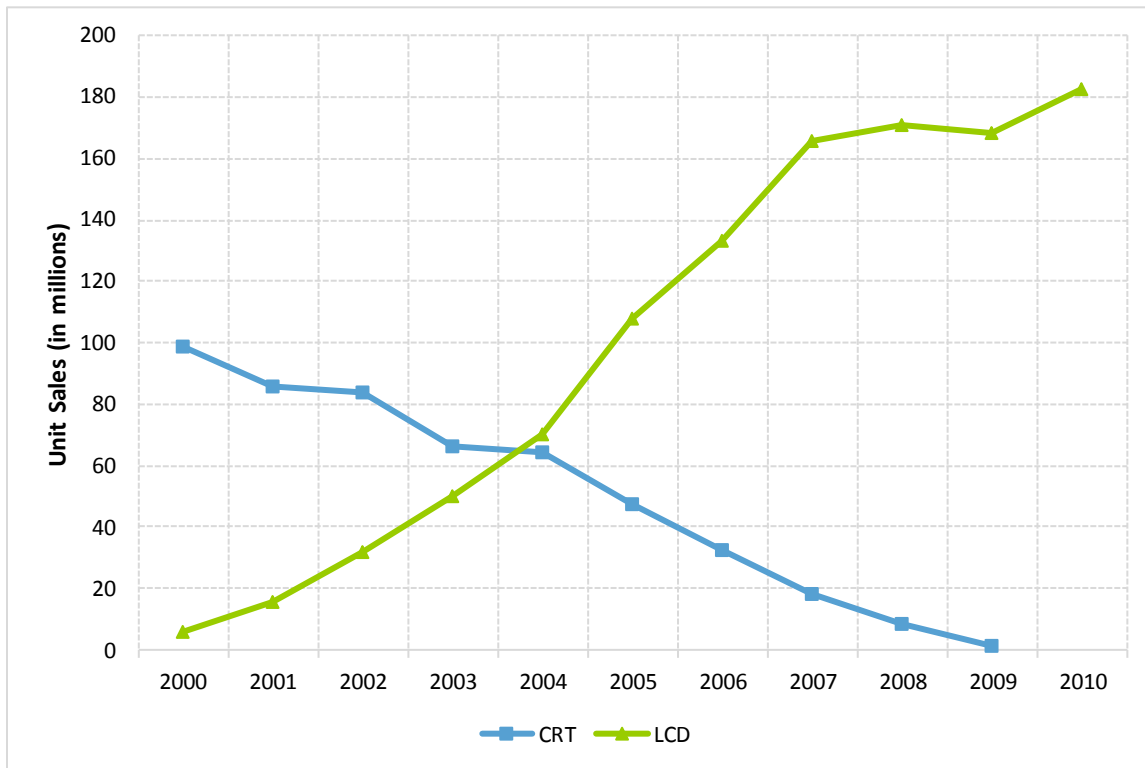
¹³ Office of Industries, US International Trade Commission, "Industry & Trade Summary: Television Picture Tubes and Other Cathode-Ray Tubes," USITC Publication 2877, May 1995, p. 6.; <http://business.highbeam.com/industry-reports/equipment/electron-tubes>; "NEC To Launch 18.1-inch High-resolution TFT Color LCD Module for Desktop Monitors," (<http://www.nec.co.jp/press/en/9803/1801.html>).

¹⁴ U.S. Environmental Protection Agency, "Computer Display Industry and Technology Profile," December 1998; NEC To Launch 18.1-inch High-resolution TFT Color LCD Module for Desktop Monitors"; "Hitachi Will Exit PC Display-Tube Business."

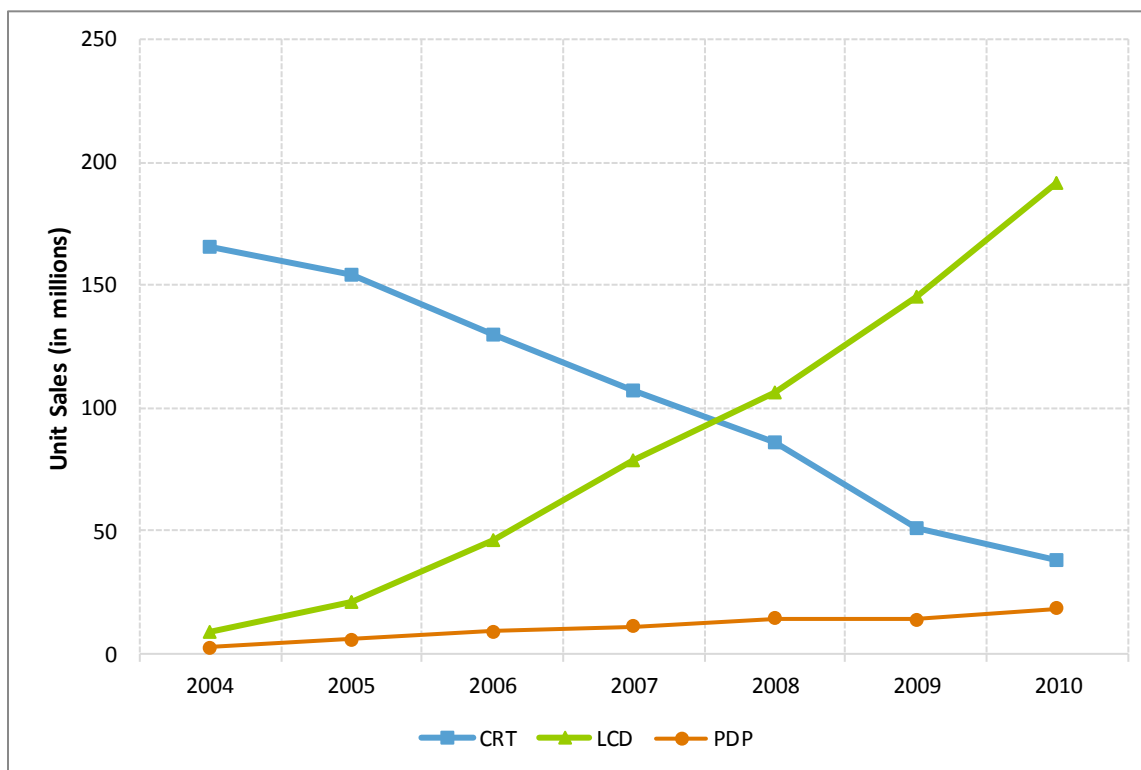
¹⁵ "CRT vs. LCD Monitor"; <http://energystart.gov/index.cfm?c=monitors.lcd>.

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Figure 1: Annual monitor unit sales by technology, 2000–2010



Source: DISP_LCD-000129.xlsx.

Figure 2: Annual TV unit sales by technology, 2004–2010

Source: DISP_LCD-000129.xlsx.

Note: PDP is an abbreviation for plasma display panel, an alternative screen technology.

II.A.1. CRT manufacturers overview

- (22) Nearly all of the companies that manufactured CRTs are included in the Complaint as Co-conspirators in this matter. Specifically, the Co-conspirators in this matter include the firms listed below.

1. *Mitsubishi*: See detailed summary in Section VI.A.
2. *Thomson entities (Thomson)*: Thomson SA is a French corporation that in 2010 changed its name to Technicolor SA.¹⁶ Thomson had subsidiaries Thomson Consumer Electronics, Inc. (now known as Technicolor USA, Inc.) and Technologies Displays Americas LLC (formerly known as Thomson Displays Americas LLC). Thomson manufactured CPTs during the 1990s and 2000s¹⁷ until it sold its business in 2005 to Indian CPT producer Videocon Industries, Ltd.¹⁸

¹⁶ The Union, “Thomson changes name to Technicolor,” <http://www.theunion.com/article/20100128/NEWS/100129756>.

¹⁷ SDCRT-0006903E-4E (Exhibit 2078EF); SDCRT-0086511 (Exhibit 8064).

¹⁸ <http://www.telecompaper.com/news/thomson-sells-crt-business-to-videocon--478065>.

3. *Chunghwa entities (Chunghwa)*: Chunghwa Picture Tubes is a Taiwanese company established in 1971 by the Tatung Corporation.¹⁹ Chunghwa Picture Tubes (Malaysia) Sdn. Bhd., or “Chunghwa Malaysia,” was a subsidiary of Chunghwa until it was closed in 2011.²⁰ Chunghwa produced both CDTs and CPTs in the 1990s and the 2000s.²¹
4. *Orion entities (Orion)*: Orion Electric Company is a Korean company owned by the Daewoo Group (“Daewoo”).²² The Daewoo group also operated the South Korean subsidiary Daewoo Electronics Corporation (formerly known as Daewoo Electronics Company) and Daewoo International Corporation.²³ Orion and Daewoo formed the Daewoo-Orion Societe Anonyme (DOSA) as a joint venture in France.²⁴ Orion produced both CDTs and CPTs in the 1990s and the 2000s.²⁵
5. *Hitachi entities (Hitachi)*: Hitachi, Ltd. is a Japanese company formed in 1910.²⁶ Hitachi owned and operated subsidiaries around the world: Hitachi Displays Ltd. (now known as Japan Display Inc.) in Japan,²⁷ Hitachi Electronic Devices (USA), Inc., Shenzhen SEG Hitachi Color Display Devices, Ltd. in China, and Hitachi America, Ltd. in the United States,²⁸ and Hitachi Asia, Ltd. in Singapore.²⁹ Hitachi, Ltd. and its subsidiaries both manufactured and sold CPTs and CDTs in the 1990s and 2000s.³⁰
6. *IRICO entities (IRICO)*: IRICO Group Corporation is a Chinese electronics company that was established in the 1970s.³¹ IRICO operated the following subsidiaries: IRICO Display Devices Co., Ltd. and IRICO Group Electronics Co., Ltd.³² IRICO produced both CDTs and CPTs in the 1990s and the 2000s.³³

¹⁹ Chunghwa Picture Tubes, Ltd., “Company Profile,” http://www.cptt.com.tw/cptt/english/index.php?option=com_content&task=view&id=13&Itemid=32.

²⁰ Chunghwa Picture Tubes, Ltd., “CPT Entered into a Sale and Purchase Agreement,” http://www.cptt.com.tw/index.php?option=com_content&task=view&id=467&Itemid=136.

²¹ CHU00028760.01E–2E (Exhibit 1117E); CHU00029262E–4.02E (Exhibit 1300E); CHU00031051.01E–5E (Exhibit 1203EF); PHLP-CRT-014272–4 (Exhibit 1866).

²² Law 360, “Daewoo Granted Chapter 15 Protection,” <http://www.law360.com/articles/12214/daewoo-granted-chapter-15-protection>.

²³ Daewoo, “Overview,” <http://www.daewoo.com/eng/company/introduce/intro.jsp>.

²⁴ <http://www.telecompaper.com/news/dosa-to-make-colour-picture-tubes--89651>.

²⁵ CHU00028786.01E – 8E (Exhibit 1293E); CHU00036414.01E - 5E (Exhibit 1174E).

²⁶ Hitachi, “History (1910-1960),” <http://www.hitachi.com/corporate/about/history/1910.html>.

²⁷ Hitachi, “History (1910-1960),” <http://www.hitachi.com/corporate/about/history/1910.html>.

²⁸ Hitachi, “About Us,” <http://www.hitachi-america.us/about/>.

²⁹ Hitachi, “Hitachi in Singapore,” <http://www.hitachi.com.sg/about/hitachi/index.html>.

³⁰ 30(b)(6) Deposition of Yasuhiko Kawashima (Hitachi), July 18, 2012, pp. 12–3 and July 19, 2012, pp. 7–9, 14–6; Heiser (Hitachi) Deposition, pp. 32–3, 40–1, 58; Kobayashi (Hitachi) Deposition, pp. 18–9.

³¹ IRICO, “About IRICO,” <http://www.ch.com.cn/english/txt.jsp?urltype=tree.TreeTempUrl&wbtreeid=1467>.

³² IRICO, “About IRICO,” <http://www.ch.com.cn/english/txt.jsp?urltype=tree.TreeTempUrl&wbtreeid=1467>.

³³ CHU00030679.01E - 83E (Exhibit 1312E); CHU00029147E-50E.

7. *LG Electronics entities (LG Electronics or LG)*: LG Electronics, Inc. was originally founded as Korean electronics company Goldstar in 1958.³⁴ LG Electronics U.S.A., Inc. is a subsidiary in the United States.³⁵ LG Electronics produced both CDTs and CPTs in the 1990s and until 2001,³⁶ when it formed LG.Philips Displays in a partnership with Koninklijke Philips Electronics N.V.³⁷
8. *Philips entities (Philips)*: Koninklijke Philips Electronics N.V. (“Philips”) is a Dutch electronics company that began its operations in 1891.³⁸ Philips operated subsidiaries in North America (Philips Electronics North America Corporation), Taiwan (Philips Electronics Industries (Taiwan), Ltd.), and Brazil (Philips da Amazonia Industria Electronica Ltda.).³⁹ Philips and its subsidiaries produced both CDTs and CPTs in the 1990s and until 2001 when it formed LG.Philips Displays as a joint venture with LG Electronics.⁴⁰
9. *LG Philips Display entities (LPD)*: LP Displays International, Ltd.⁴¹ is the result of a joint venture between LG Electronics and Philips that combined the CRT manufacturing of the companies.⁴² LPD continued to produce both CPTs and CDTs in the 2000s.⁴³
10. *Samsung entities*: Samsung SDI Co. Ltd. (“Samsung SDI”) is a Korean electronics company that was founded in 1970.⁴⁴ Samsung SDI operates subsidiaries worldwide, including: Samsung SDI Co. Ltd., Samsung SDI America, Inc., Samsung SDI Mexico S.A. de C.V., Samsung SDI Brasil Ltda., Shenzhen Samsung SDI Co. Ltd., Tianjin Samsung SDI Co. Ltd., and Samsung SDI Malaysia Sdn. Bhd.⁴⁵ Samsung SDI manufactured both CDTs and CPTs during the 1990s and 2000s.⁴⁶
11. *Thai CRT Company, Ltd. (Thai CRT)*: Thai CRT is a Thailand-based CRT manufacturer founded in 1986 with promotional privileges from the Thai government.⁴⁷ During the Class Period, Thai

³⁴ LG, “Our Brand,” <http://www.lg.com/global/about-lg/our-brand>.

³⁵ Second Amended Direct Purchaser Plaintiffs’ Class Action Complaint against Mitsubishi and Thomson, Crago, d/b/a Dash Computers, Inc., et al. v. Mitsubishi Electric Corporation, et al., Case No.14-CV-2058 (JST), August 6, 2015 (Complaint) at 52.

³⁶ 30(b)(6) Deposition of M.H. Seong (LG), July 9, 2012 (M.H. Seong (LG) Deposition), pp. 14-5 and 84-6.

³⁷ <http://www.appliancedesign.com/articles/88212-philips-and-lg-join-forces-in-display-components-activities>.

³⁸ Philips, “Our Heritage,” <http://www.philips.com/a-w/about/company/our-heritage.html>.

³⁹ Complaint at ¶ 64.

⁴⁰ <http://www.appliancedesign.com/articles/88212-philips-and-lg-join-forces-in-display-components-activities>; CHU00030701.01E-4.02E (Exhibit 1857E).

⁴¹ On April 1, 2007, LG Philips Displays changed its name to LP Displays. See <http://www.prnewswire.co.uk/news-releases/lgphilips-displays-announces-new-name-and-logo-153538085.html>.

⁴² <http://www.appliancedesign.com/articles/88212-philips-and-lg-join-forces-in-display-components-activities>.

⁴³ CHU00578883.01E-5E (Exhibit 1871E).

⁴⁴ Samsung SDI, “History,” <http://www.samsungsdi.com/about-sdi/history/1970s.html>.

⁴⁵ Complaint at ¶ 72.

⁴⁶ Jae In Lee (Samsung SDI) Deposition (2012), pp. 71, 77-9, 95, 133, and 237.

⁴⁷ The Economic Times, “Videocon in Talks to buy Thai CRT,” http://articles.economictimes.indiatimes.com/2006-08-31/news/27462932_1_daewoo-electronics-videocon-industries-venugopal-dhoot.

CRT was owned in part by Siam Cement Group (~60%) and by Mitsubishi (~20%).⁴⁸ As of 2005, Siam Cement purchased Mitsubishi's remaining stake in Thai CRT.⁴⁹ Thai CRT produced both CDTs and CPTs in the 1990s and the 2000s.⁵⁰

12. *Panasonic entities (Panasonic)*: Panasonic Corporation is a Japanese electronics company formerly known as Matsushita Electric Industrial, Ltd.⁵¹ Panasonic operated subsidiaries in North America (Panasonic Corporation of North America) and in China through a joint venture with People's Republic of China (Beijing-Matsushita Color CRT Company, Ltd., also known as BMCC).⁵² Panasonic and its subsidiaries sold both CPTs and CDTs in the 1990s and 2000s.⁵³ Panasonic and Toshiba formed a joint venture called Matsushita Toshiba Picture Display Co., Ltd., (MTPD) in September 2002 that consolidated the companies' CRT businesses.⁵⁴ Panasonic purchased Toshiba's ownership in the joint venture in March 2007, and is now the primary owner of MTPD.⁵⁵

13. *Toshiba Entities (Toshiba)*: Toshiba Corporation is a Japanese company that produces a wide range of electronic products.⁵⁶ Toshiba, along with its subsidiaries Toshiba America Consumer Products, L.L.C., Toshiba America Information Systems, Inc., and Toshiba America Electronic Components, Inc., produced CPTs and CDTs in the 1990s and 2000s.⁵⁷ Toshiba announced in September 2002 that it had formed MTPD in a joint venture with Panasonic to focus on CRT production.⁵⁸ Panasonic purchased Toshiba's ownership share in March 2007.⁵⁹

⁴⁸ See Deposition of Hideo Innami (Mitsubishi), April 25-26, 2016 (Hideo Innami (Mitsubishi) Deposition), 90 and ME00072237 (Exhibit 8344).

⁴⁹ SCG, "Thai CRT Co., Ltd. (TCRT) Restructures Ownership," http://www.scg.co.th/en/04investor_governance/03_investors_news/detail.php?ContentId=28.

⁵⁰ CHU00029293-7 (Exhibit 1214); CHU00029116.01E-23E (Exhibit 709EF).

⁵¹ Panasonic, "Corporate History," <http://www.panasonic.com/global/corporate/history/chronicle.html>.

⁵² Panasonic, "Joint Venture Company with Beijing established," <http://www.panasonic.com/global/corporate/history/chronicle/1987.html>.

⁵³ CHU00028755.01E-6.02E (Exhibit 1857E); CHU00031006.01E – 09.02E (Exhibit 1307E).

⁵⁴ Toshiba, "Matsushita and Toshiba to Consolidate CRT Business," https://www.toshiba.co.jp/about/press/2002_09/pr2601.htm.

⁵⁵ <https://www.panasonic.com/global/corporate/profile/history.html>.

⁵⁶ Toshiba, "Products and Services," <http://www.toshiba.co.jp/product/index.htm>.

⁵⁷ 30(b)(6) Deposition of Richard Huber (Toshiba), August 1, 2012, pp. 17–8, 29–31, 35–6; 30(b)(6) Deposition of Jay Heinecke (Toshiba), July 31, 2012, pp. 31–2 and 69–72; 30(b)(6) Deposition of Koji Kurosawa (Toshiba), July 30, 2012, pp. 37–40, 51–2, 56–60, and 78.

⁵⁸ Toshiba, "Matsushita and Toshiba to Consolidate CRT Business," https://www.toshiba.co.jp/about/press/2002_09/pr2601.htm.

⁵⁹ <https://www.panasonic.com/global/corporate/profile/history.html>.

⁵⁹ Bloomberg, "Company Overview of MT Picture Display CO., Ltd.," <http://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=24918054>.

14. *MT Picture Display Co., Ltd. (MTPD)*. *MT Picture Display Co.*⁶⁰ is a joint venture between Panasonic and Toshiba.⁶¹ MTPD made both CDTs and CPTs, but as of 2003 focused on CPTs.⁶² The company is now primarily owned by Panasonic.⁶³

- (23) Figure 3 through Figure 5 show market shares for CDTs, CPTs, and CRTs over time. Collectively, the Co-conspirators accounted for at least 88% of CDT sales worldwide and at least 81% of CPT sales worldwide for the years in which data are available.⁶⁴ Thus, purchasers of CRTs had limited if any outside options from which to purchase CRTs in response to Co-conspirators' attempts to raise prices above competitive levels, making it more likely that their attempts to increase prices would succeed.

⁶⁰ Note that in 2007, Matsushita Toshiba Picture Display Co., Ltd changed its name to MT Picture Display Co. *See* <http://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=24918054>.

⁶¹ Bloomberg, "Company Overview of MT Picture Display CO., Ltd.," <http://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=24918054>.

⁶² Deposition of Kazuhiro Nishimaru (Toshiba/MTPD), June 26-28, 2013 (Nishimaru (Toshiba/MTPD) Deposition), pp. 95-7; Deposition of Yasuki Yamamoto (Toshiba/MTPD), July 1-3, 2013 (Yamamoto (Toshiba/MTPD) Deposition), pp. 77-9.

⁶³ Toshiba, "Matsushita and Toshiba to Consolidate CRT Business," https://www.toshiba.co.jp/about/press/2002_09/pr2601.htm.

⁶⁴ Bloomberg, "Company Overview of MT Picture Display CO., Ltd.," <http://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=24918054>.

⁶⁴ CRT and CPT share data are only available for 2000 to 2006. CDT share data is available back to 1996.

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Figure 3: CDT market share through time (%)

Manufacturer		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Co-conspirators	Chunghwa	21	16	18	21	20	21	23	24	24	24	26
	Hitachi	13	14	9	5	5	3					
	IRICO	0.3	0.04		0.8	0.9						
	LPD ⁶⁵	17	19	22	25	23	24	28	31	33	32	29
	Mitsubishi	2	2	2	3	5	5	4	3	0.7		
	MTPD ⁶⁶	16	17	13	10	7	5	4	0.7			
	Orion	5	5	6	6	6	7	5	4	2	3	1
	Samsung	16	16	20	21	23	28	33	36	40	41	43
	Thai CRT					0.3						
Co-conspirator market share		90	88	90	90	91	93	96	99	100	100	100
Others	NEC	3	2	1	1							
	Sony	8	10	7	7	7	5	2	0.9	0.2		
	TECO			0.9	2	2	1	2	0.2			
	Others						1					
Others' market share		10	12	10	10	9	6	4	1	0.2		

Source: Backup materials for Expert Report of Dr. Kenneth G. Elzinga (April 15, 2014) in *In re: Cathode Ray Tube (CRT) Antitrust Litigation*. Dr. Dennis Carlton also filed an expert report in *In re: Cathode Ray Tube (CRT) Antitrust Litigation* with market share information which is nearly identical to the shares reported by Dr. Elzinga as reported here.

⁶⁵ LPD was formed as a joint venture in 2001 between LG and Philips. For simplicity, I report its pre-2001 market share as the sum of LG and Philips production in this chart, as well as Figure 4 and Figure 5.

⁶⁶ MTPD was formed as a joint venture in 2003 between Matsushita (now Panasonic) and Toshiba. For simplicity, I report its pre-2003 market shares as the sum of Panasonic and Toshiba production, as well as Figure 4 and Figure 5.

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Figure 4: CPT market share through time (%)⁶⁷

Manufacturer		2000	2001	2002	2003	2004	2005	2006
Co-conspirators	Chunghwa	6	4	5	5	7	6	8
	Hitachi	3	3	2	2	3	3	3
	IRICO	4	5	5	6	6	7	7
	LPD	24	24	24	23	21	23	22
	MTPD	13	13	13	12	12	12	10
	Orion	5	6	5	4	3	4	3
	Samsung	16	17	18	18	20	21	21
	Thai CRT	3	2	3	3	3	2	2
	Thomson	10	8	8	8	9	9	10
Co-conspirator market share		83	83	83	82	84	86	86
Others	BDDL	0.5	0.6	0.5	0.2	0.5	0.5	0.7
	Dongguan	2	2	2	3			
	Ekransas	1	2	2	2	2	2	0.7
	Hot Line	0.7	0.9	1	1	2	1	0.4
	JCT	0.8	0.4	0.7	0.7	0.8	0.8	1
	New Co							1
	Novel	3	3	3	4	3	3	3
	Samtel	1	2	2	2	3	3	4
	Sony	7	7	5	5	5	4	3
	Tesla	0.3	0.3	0.2	0.4	0.3	0.3	0.03
Others' market share		17	17	17	18	16	14	14

Source: Backup materials for Expert Report of Dr. Kenneth G. Elzinga (April 15, 2014) in *In re: Cathode Ray Tube (CRT) Antitrust Litigation*.

⁶⁷ Mitsubishi stopped producing CPTs by 1998, two years before data on CPT market shares are available.

Figure 5: CRT market shares through time (%)

Manufacturer		2000	2001	2002	2003	2004	2005	2006
Co-conspirators	Chunghwa	12	11	11	10	11	10	11
	Hitachi	3	3	2	2	2	2	3
	IRICO	3	3	4	4	5	6	6
	LPD	24	24	25	25	24	25	23
	Mitsubishi	2	2	1	0.7	0.2		
	MTPD	11	10	10	9	9	9	9
	Orion	6	6	5	4	3	3	3
	Samsung	19	21	23	23	24	25	25
	Thai CRT	2	2	2	2	2	2	1
	Thomson	6	5	5	6	7	7	8
Co-conspirator market share		86	86	87	86	87	89	88
Others	BDDL	0.3	0.4	0.4	0.2	0.4	0.4	0.6
	Dongguan	1	1	2	2			
	Ekransas	0.7	1	1	2	2	1	0.6
	Hot Line	0.4	0.6	0.7	0.9	1	0.9	0.3
	JCT	0.5	0.3	0.5	0.5	0.6	0.6	1
	New Co							1
	Novel	2	2	2	3	2	2	2
	Samtel	0.9	1	1	2	2	2	3
	Sony	7	6	4	4	4	3	2
	TECO	0.6	0.4	0.6				
	Tesla	0.2	0.2	0.2	0.3	0.3	0.2	
	Others		0.5					
Others' market share		14	13	13	14	13	11	12

Source: Backup materials for Expert Report of Dr. Kenneth G. Elzinga (April 15, 2014) in *In re: Cathode Ray Tube (CRT) Antitrust Litigation*.

- (24) As listed in Section II.A.1, 14 Co-conspirator entities are alleged to have participated in the CRT cartel.⁶⁸ Although there is literature supporting the conclusion that a cartel may be easier to organize if fewer firms are involved,⁶⁹ the CRT cartel falls within the range of other prosecuted cartels. For example, the European Commission (EC) implicated 11 conspirators for fixing prices of carbonless

⁶⁸ This number is potentially conservative in that it counts (1) LG, Philips, and LPD, separately even though LPD is a joint venture of LG and Philips and (2) Panasonic, Toshiba, and MTPD separately even though MTPD is a joint venture of Panasonic and Toshiba.

⁶⁹ See, e.g., Jonathan B. Baker, "Mavericks, Mergers and Exclusion: Proving Coordinated Competitive Effects Under the Antitrust Laws", *New York Law Review* (77, No. 1), 135–203.

paper,⁷⁰ 14 members in the industrial bags cartel,⁷¹ and 19 in the cartonboard cartel.⁷² The number of cartel members alone does not mean that a cartel could not exist or would not have been successful.

II.B. Barriers to entry

- (25) The CRT industry is characterized by several barriers to entry, which are factors that impede the ability of suppliers to expand production or new suppliers to add production capacity. Some of the barriers to entry in the CRT market include the following:
- Building a new production facility is expensive. Evidence indicates that it would cost between \$50 million and \$300 million to build a new CRT production facility.⁷³
 - Even once a facility is built and operating, substantial ongoing capital investments are required.⁷⁴
 - Building a new plant can take a year and require an additional year to get the completed line up to mass production speeds.⁷⁵

⁷⁰ See http://europa.eu/rapid/press-release_IP-01-1892_en.htm?locale=en.

⁷¹ See <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32007D0686&from=EN>.

⁷² See ¶¶ 1 and 73 of the EC's July 7, 1994 decision in IV/C/33.833 – Cartonboard.

⁷³ M.H. Seong (LG) Deposition, pp. 117–8. An LG witness estimated that it would cost \$100 million to “set up a CRT production facility capable of producing CRTs at speeds making production cost competitive.”

A new CRT facility will cost approximately 10 billion yen or \$120-130 million. Tobinaga (Panasonic) Deposition at 146:8–147:8, 151:15–152:11.

An LG plant in Korea, for the production of 24"-32" CPTs beginning in 1996, cost \$125 million and was expected to produce 1 million CPTs per year. Telecompaper, 06 September 1995, LG Electronics to Invest in CRT Plant, <http://www.telecompaper.com/news/lg-electronics-to-invest-in-crt-plant>.

A Sony plant for 15" and 17" CDT with a capacity of 1 million units per year cost \$50 million. Telecom paper, July 20, 1994, Sony Electronics to Invest in Cathode Ray Tube Plant, <http://www.telecompaper.com/news/sony-electronics-to-invest-in-cathode-ray-tube-plant>, at 1.

In the late 1980s a large screen (25" or more) CRT manufacturing facility generally cost between \$200 and \$300 million. Martin Kenney, Undated, “The Shifting Value Chain: The Television Industry in North America,” http://hcd.ucdavis.edu/faculty/webpages/kenney/articles_files/The%20Shifting%20Value%20Chain_%20The%20Television%20Industry%20in%20North%20America.pdf, at 105.

Pat Magrath of Georgetown Economic Services stated before the International Trade Commission on Feb. 17, 2000 that CPT factories cost between \$70 and \$332 million to build. United States International Trade Commission, Feb. 17, 2000, US International Trade Commission In the Matter of: Color Picture Tubes from Canada, Japan, Korea, and Singapore, SDCRT-0068880-SDCRT-0069081, at 8922.

⁷⁴ LG's investment plans for updating existing lines to produce its “Flatron” real flat CRTs ranged from 22 billion to 68 billion Won. (approximately \$14 million to \$45 million in 2001 dollars). Salomon Smith Barney Inc., May 22, 2001, Project Mercury Confidential Information Memorandum, EIN0017699-EIN0018075, at 7842.

Toshiba invested over \$150 million in its existing Horseheads, NY CRT plant in the five years up to March 2003. Panasonic, Mar. 27, 2003, Matsushita and Toshiba To Launch North American Operations of New CRT Joint Venture, http://www.Panasonic.com/MECA/press_releases/toshiba_032703.pdf, at 1. In 1986, Toshiba spent \$220 million to “refurbish and expand” its facility in Horseheads, NY. Martin Kenney, Undated, “The Shifting Value Chain: The Television Industry in North America,”

http://hcd.ucdavis.edu/faculty/webpages/kenney/articles_files/The%20Shifting%20Value%20Chain_%20The%20Television%20Industry%20in%20North%20America.pdf, at 105.

⁷⁵ Tobinaga (Panasonic) Deposition at 146:8-147:8.

- The costs of a new facility are largely what economists consider sunk costs. For example, the manufacturing equipment largely cannot be reused and may be “destroyed” after the facility is shut down.⁷⁶

(26) As I discuss in my book *The Economics of Collusion*, entry from new suppliers is one of the forces that affects industry profitability.⁷⁷ The existence of barriers to entry can facilitate a cartel’s ability to increase prices above competitive levels because it limits the ability of non-cartel members to start/expand production to undermine the price increases of the cartel firms. As one academic article explains, “High barriers to entry may facilitate agreements by permitting collusive groups relatively wide freedom to appease the often conflicting demand of participants.”⁷⁸

II.C. Guilty pleas, indictments, and findings

(27) Eleven of the Co-conspirators in this matter have admitted to their participation in the CRT cartel or been implicated by governmental authorities around the world, including those in the United States, Europe, the Czech Republic, Korea, and Japan.⁷⁹ The findings by these government authorities provide useful context for what the CRT conspirators set out to do and succeeded in doing. In addition, the findings of these governmental authorities are relevant to my analysis because the economics literature recognizes that aspects of an industry can affect the ability of a cartel to effectively suppress competition. The presence of these findings tells me that it is unlikely that there are aspects of the CRT industry that significantly obstruct collusion. The findings of those government agencies are summarized below.

II.C.1. United States

(28) Samsung SDI pled guilty in 2011 to criminal charges and agreed to pay a \$32 million fine “for its role in a global conspiracy to fix prices, reduce output and allocate market shares of color display tubes” from “at least as early as January 1997, until at least as late as March 2006.”⁸⁰ Samsung SDI admitted that it and its co-conspirators agreed to reduce output by shutting down production lines, allocating

It can take two years to complete a plant or add a line. Testimony of Pat Magrath, United States International Trade Commission, Feb. 17, 2000, United States International Trade Commission In the Matter of: Color Picture Tubes from Canada, Japan, Korea, and Singapore, SDCRT-0068880 – 69081 at 8922.

⁷⁶ Tobinaga (Panasonic) Deposition, pp. 147–9.

⁷⁷ Michael E. Porter, *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (New York: Free Press). Robert C. Marshall and Leslie M. Marx, *The Economics of Collusion: Cartels and Bidding Rings* (Cambridge, MA: MIT Press, 2012, 4–5. (Marshall and Marx, *Economics of Collusion*)

⁷⁸ Peter Asch and Joseph Seneca (1975), “Characteristics of Collusive Firms,” *Journal of Industrial Economics*, 23(3), p. 224.

⁷⁹ The eleven entities are Thomson, Chunghwa, LG Electronics, LPD, Philips, Orion, Samsung SDI, Thai CRT, Panasonic, Toshiba, and MT Picture Display. See Figure 6.

⁸⁰ <https://www.justice.gov/opa/pr/samsung-sdi-agrees-plead-guilty-color-display-tube-price-fixing-conspiracy>.

market shares, and charging prices at certain target levels or ranges.⁸¹ To monitor and enforce the conspiracy and its agreements, the firms “exchanged CDT sales, production, market share, and pricing information.”⁸²

(29) In addition to Samsung SDI’s plea agreement, the U.S. Department of Justice (DOJ) indicted six executives alleged to be involved in the CRT conspiracy. These indictments note the same types of actions as Samsung SDI’s plea agreement: agreements to allocate market shares for the industry and specific customers, increase prices by setting target levels or ranges, restrict output by shutting down production lines, and monitor the agreements through information exchange and production audits. Further, the firms “took steps to conceal the conspiracy and conspiratorial contacts.”⁸³ The six executives indicted are listed below.

- Cheng Yuan Lin, Chairman and Chief Executive Officer of Chunghwa, was indicted for his role in the CRT conspiracy from at least as early as January 28, 1997 until at least as late as April 7, 2003 for CDTs and at least as early as March 12, 1997 until at least as late as April 7, 2003 for CPTs.⁸⁴
- Wen Jun Cheng, Assistant Vice President of Sales and Marketing for Chunghwa, was indicted for his role in the CRT conspiracy from at least as early as January 1999 continuing until at least September 2004 for CDTs.⁸⁵
- Chung Cheng Yeh, Director of Sales for Chunghwa, was indicted for his role in the CRT conspiracy from at least as early as May 1999 continuing until at least March 2004 for CDTs.⁸⁶
- Seung-Kyu Lee, responsible for CDT sales for LPD, was indicted for his role in the CRT conspiracy from at least as early as January 2000 and continuing until at least December 2005 for CDTs.⁸⁷
- Yeong-Ug Yang, responsible for CRT sales for LPD, was indicted for his role in the CRT conspiracy from at least as early as June 2003 and continuing until at least March 2006 for CDTs.⁸⁸

⁸¹ <https://www.justice.gov/atr/case-document/information-us-v-samsung-sdi-company-ltd>.

⁸² <https://www.justice.gov/atr/case-document/information-us-v-samsung-sdi-company-ltd>.

⁸³ <https://www.justice.gov/atr/case-document/indictment-80>.

⁸⁴ <https://www.justice.gov/atr/case-document/indictment-83>.

⁸⁵ <https://www.justice.gov/atr/case-document/indictment-28>. The DOJ alleged that “coconspirators of the defendant” were involved in collusive behavior related to CDTs “[b]eginning at least as early as January 1997, until at least as late as March 2006.”

⁸⁶ <https://www.justice.gov/atr/case-document/file/782296/download>. The DOJ alleged that “coconspirators of the defendant” were involved in collusive behavior related to CDTs “[b]eginning at least as early as January 1997, until at least as late as March 2006.”

⁸⁷ See <https://www.justice.gov/opa/pr/three-former-executives-indicted-color-display-tube-price-fixing-conspiracy>, <https://www.justice.gov/atr/case-document/indictment-80>, and CHU00031182.01E (Exhibit 1184E) (the indictment does not list an employer). The DOJ alleged that “coconspirators of the defendant” were involved in collusive behavior related to CDTs “[b]eginning at least as early as January 1997, until at least as late as March 2006.”

- Jae-Sik Kim, CRT Sales Division Head for Samsung SDI, was indicted for his role in the CRT conspiracy from at least as early as June 2003 and continuing until at least March 2006 for CDTs.⁸⁹

II.C.2. Overview of European Commission decision and fines

- (30) In December 2012, the EC issued a total of €1.47 billion in fines to several members of the CRT cartel (approximately \$1.9 billion at December 2012 exchange rates).⁹⁰ The EC found that a cartel existed “with the aim of fixing prices worldwide, allocating market shares and customers and restricting output” of CDTs from at least October 1996 through March 2006.⁹¹ The EC also found that a cartel existed “with the aim of fixing prices, allocating market shares and restricting output” of CPTs from at least December 1997 to November 2006.⁹² The EC implicated Chunghwa, Samsung SDI, Philips, LG Electronics, and LPD for their conspiratorial conduct related to CDTs and CPTs. Thomson, Panasonic, Toshiba, and MTPD were implicated for conduct related to CPTs.⁹³ In its 2011 Annual Report, Technicolor SA (the new name of Thomson) admitted that to its role in the cartel.⁹⁴ The EC determined that LG, Philips, Panasonic, and Toshiba participated in the conspiracy through their joint ventures LPD (LG and Philips) and MTPD (Panasonic and Toshiba).⁹⁵
- (31) The EC determined that the cartels’ efforts to fix prices of CPTs and CDTs were “not spontaneous or haphazard developments but planned and structured,” involving both multilateral and bilateral meetings, as well as multiple corporate levels of meetings.⁹⁶

II.C.3. Japanese Fair Trade Commission Cease-and-Desist order

- (32) The Japan Fair Trade Commission (JFTC) issued a total of ¥4,254,920,000 in fines to MTPD, Samsung SDI, LPD, Chunghwa, and Thai CRT in 2009 and 2010 (approximately \$47 million at

⁸⁸ See <https://www.justice.gov/opa/pr/three-former-executives-indicted-color-display-tube-price-fixing-conspiracy>, <https://www.justice.gov/atr/case-document/indictment-80>, and MTPD-0423675E (Exhibit 1932EF) (the indictment does not list an employer). The DOJ alleged that “coconspirators of the defendant” were involved in collusive behavior related to CDTs “[b]eginning at least as early as January 1997, until at least as late as March 2006.”

⁸⁹ See <https://www.justice.gov/opa/pr/three-former-executives-indicted-color-display-tube-price-fixing-conspiracy>, <https://www.justice.gov/atr/case-document/indictment-80>, and SDCRT-0022048 (Exhibit 2098EF) (the indictment does not list an employer). The DOJ alleged that “coconspirators of the defendant” were involved in collusive behavior related to CDTs “[b]eginning at least as early as January 1997, until at least as late as March 2006.”

⁹⁰ EC Decision in Case AT.39437 – TV and computer monitor tubes, December 5, 2012 (EC CRTs Decision), ¶ 3. The EC treated the CPT and CDT markets as separate cartels for its investigation and prosecution of the case.

⁹¹ EC CRTs Decision, ¶ 108.

⁹² EC CRTs Decision, ¶¶ 9, 119.

⁹³ EC CRTs Decision ¶¶ 986 and ¶ 1003.

⁹⁴ Technicolor Annual Report 2011 at 226.

⁹⁵ EC CRTs Decision, ¶ 531 and ¶ 985.

⁹⁶ EC CRTs Decision, ¶ 651.

October 2009 exchange rates).⁹⁷ The JFTC found that the companies had violated Article 3 of the Antimonopoly Act, the prohibition of unreasonable restraint of trade. Specifically, beginning no later than May 22, 2003, the firms “formed an agreement to continuously hold CPT meetings about once every other month where they joint set minimum target prices.”⁹⁸

II.C.4. Korean Fair Trade Commission decision and fines

- (33) The Korean Fair Trade Commission (KFTC) investigated Samsung SDI, Chunghwa, and LPD and issued the equivalent of \$21.5 million in fines to Samsung SDI (24.013 billion Korean Won) and \$2 million in fines to Chunghwa (2.258 billion Korean Won) on March 10, 2011. The KFTC found that the companies “jointly set up the CDT sales price, allocated the CDT market share, and agreed on the limitation of production,” from at least November 23, 1996 to March 14, 2006.⁹⁹ The KFTC notes that the companies periodically held multilateral cartel meetings, the “CDT glass meetings,” where the companies exchanged “sensitive sales information [such] as each company’s production capacity, operation rate, production plans, sales prices, customer demands, and customer reactions.”¹⁰⁰ At each meeting, the companies “checked whether other companies adhered to the agreements reached during the previous meeting.”¹⁰¹ Further, the companies “hid evidences related to the agreements in order to maintain the cartel’s discussions confidential.”¹⁰²

II.C.5. Overview of Czech Competition Authority findings

- (34) The Czech Competition Authority fined Chunghwa, Technicolor S.A., Panasonic, MTPD, and Toshiba a total of CZK 51.787 million in September 2010 (approximately \$2.75 million at then-current exchange rates). It could not impose a fine on Philips and LG Electronics because the statutory time limit for its imposition had already expired. Samsung SDI was implicated, but its fine appears to have been “remitted completely” because of an application for leniency.¹⁰³ The Authority

⁹⁷ Cease-and-Desist Orders of the JFTC, October 7, 2009 and March 29, 2010.

⁹⁸ Cease-and-Desist Orders of the JFTC, October 7, 2009 and March 29, 2010.

⁹⁹ KFTC Decision no. 2011-019 (Translation), March 10, 2011, Exhibit 630EF (KFTC Decision)) at ¶ 27.

¹⁰⁰ KFTC Decision at ¶ 28.

¹⁰¹ KFTC Decision at ¶ 28.

¹⁰² KFTC Decision at ¶ 31.

The KFTC’s decision and notes from many of the CRT meetings have been translated from their original language and, as a result, there are often grammar mistakes or other idiosyncrasies of translation. Rather than note these errors every time, I include the text as provided in the original translation without including a “[sic]” for each error to improve readability.

Moreover, I understand that there may be some potential disputes regarding the translations for certain documents in this matter, and that these disputes are ongoing. To the extent that the final translations change, I reserve the right to reconsider those translations and incorporate them as necessary.

¹⁰³ Press release by Czech Office for the Protection of Competition (September 13, 2010) (Czech press release), available at <https://www.uohs.cz/en/information-centre/press-releases/competition/1187-cartel-of-color-picture-tube-manufacturers-fined.html>.

found that the manufacturers of CRTs had met bilaterally and multilaterally from 1998 to 2004 to fix “end and minimum prices, price range and prices rules or maintenance of the agreed prices.”¹⁰⁴

II.C.6. Summary

- (35) Figure 6 summarizes the findings of the governmental authorities worldwide related to CRTs.¹⁰⁵

¹⁰⁴ See Czech press release.

¹⁰⁵ There are three Co-conspirator entities that have not been implicated by governmental authorities but for whom the evidence suggests conduct consistent with participation in a cartel and inconsistent with its unilateral self-interest. Examples include the following:

Hitachi:

- HDP-CRT00025646E–7E (Exhibit 1533E) (January 17, 1996): Notes from a meeting with Samsung marked “(handle with care/destroy after reading)” reflect a detailed discussion of future production levels and Samsung’s “strategy” for certain CDTs.
- CHU00028740E – 43E (Exhibit 1120) (April 23, 1997): Notes from a meeting that Hitachi did not attend reflect details of Hitachi’s production and inventory levels and state that Mr. Na of Samsung SDI “will persuade Hitachi to follow to USD110.00/pc” and that “Also, [the meeting attendees] should get together once a week; have discussions on HTC’s attitude and the development of market situation so as to determine the price for May.”
- CHU00028393E (Exhibit 1121E) (April 29, 1997): Notes from a meeting between Chunghwa and Hitachi reflect an “exchange of market information” and note that “As for the matters concerning price hike, HTC said that price hike for 17” must go forward and it has already notified everyone” (emphasis in original).
- SDCRT-0087694E (May 10 – 12, 2001): Notes from a meeting attended by Hitachi, LG, Chunghwa, IRICO, Philips, Samsung SDI, and BMCC indicate that Co-conspirators discussed setting prices “for the next three months,” along with inventories and production line status.
- SDCRT-0087701E (August 9, 2001): Notes from a meeting attended by Hitachi, LG, Chunghwa, IRICO, Philips, Samsung SDI, and BMCC indicate that the firms discussed production reduction plans, pricing proposals, and forming an inspection team to make sure the production plans are being implemented.

IRICO:

- CHU000030688E – 91E (Exhibit 1303) (December 8-10, 1998): Notes from a “routine China CDT MAKER contact meeting” reflect IRICO’s current and future production levels and was attended by IRICO’s president.
- CHU00030679E – 83E (Exhibit 1312) (October 9, 1998): Meeting notes reflect that IRICO provided data on its “planned production” in future months and for the subsequent year (1999). The notes also reflect that “The next meeting will be convened by IRICO.”
- CHU00030695E – 97E (Exhibit 1301) (January 8, 1999): Meeting notes reflect IRICO’s attendance at the meeting and IRICO’s production data.
- SDCRT-0087694E (May 10 – 12, 2001): Notes from a meeting attended by Hitachi, LG, Chunghwa, IRICO, Philips, and Samsung SDI indicate that Co-conspirators discussed setting prices “for the next three months,” along with inventories and production line status.
- SDCRT-0087701E (August 9, 2001): Notes from a meeting attended by Hitachi, LG, Chunghwa, IRICO, Philips, Samsung SDI, and BMCC indicate that the firms discussed production reduction plans, pricing proposals, and forming an inspection team to make sure the production plans are being implemented.

Mitsubishi: Discussed in detail in Section VI.

Figure 6: Summary of worldwide governmental authorities findings

Entity	U.S. DOJ	European Commission	Japan Fair Trade Commission (JFTC)	Korea Fair Trade Commission (KFTC)	Czech Competition Authority (CCA) ¹⁰⁶
Thomson ¹⁰⁷		CPT: 3/25/1999– 9/19/2005			CPT: 1998–2004
Chunghwa	CDT: 1/28/1997-9/2004 ¹⁰⁸ CPT: 3/12/1997–4/7/2003 ¹⁰⁹	CDT: 10/24/1996–3/14/2006 CPT: 12/3/1997–12/6/2005	CPT: starting 5/22/2003	CDT: 11/23/1996–3/14/2006	CPT: 1998–2004
LG Electronics	CDT: 1/2000-6/30/2001 ¹¹⁰	CDT: 10/24/1996–6/30/2001 CPT: 12/3/1997–6/30/2001			CPT: 1998–2004
LG Philips Display	CDT: 7/1/2001-3/2006 ¹¹¹	CDT: 7/1/2001–1/30/2006 CPT: 7/1/2001–1/30/2006	CPT: starting 5/22/2003	CDT: 6/30/2001–3/14/2006 ¹¹²	
Philips		CDT: 1/28/1997–6/30/2001 CPT: 9/21/1999–6/30/2001			CPT: 1998–2004
Orion				CDT ¹¹³	
Samsung SDI	CDT: 1/1997–3/2006	CDT: 11/23/1996–3/14/2006 CPT: 12/3/1997–11/15/2006	CPT: starting 5/22/2003	CDT: 11/23/1996–3/14/2006	CPT: 1998–2004
Thai CRT			CPT: starting 5/22/2003		

¹⁰⁶ The CCA noted that “some of the mentioned companies participated in the agreement for a shorter period which the Office took into account in its decision.” Czech press release.

¹⁰⁷ As noted above, Thomson also admitted its participation in its 2011 Annual report.

¹⁰⁸ The dates presented here are the earliest and latest dates covered in the DOJ indictments related to CDTs for the three Chunghwa employees noted above (Cheng Yuan Lin, Wen Jun Cheng, and Chung Cheng Yeh). The dates alleged by the DOJ overlap for these three indictments.

The DOJ indictment also states that, “Beginning at least as early as January 1997, until at least as late as March 2006, the exact dates being unknown to the Grand Jury, coconspirators of the defendant joined, entered into, and engaged in a combination and conspiracy to suppress and eliminate competition by fixing prices, reducing output, and allocating market shares of color display tubes (‘CDTs’) to be sold in the United States and elsewhere.” *See* <https://www.justice.gov/atr/case-document/indictment-28>.

¹⁰⁹ As noted above, Cheng Yuan Lin of Chunghwa was indicted by the DOJ related to CDTs and CPTs. The CPT dates here are those specifically for Cheng Yuan Lin.

¹¹⁰ The DOJ indicted two employees related to LPD for their conduct related to CDTs. The period of Seung-Kyu Lee’s indictment (January 2000 until at least December 2005) includes time before and after the founding of LPD. The period of Yeong-Ug Yang’s indictment only includes time working for LPD.

As noted earlier, the DOJ indictments alleged collusion related to CDTs “[b]eginning at least as early as January 1997, until at least as late as March 2006.” *See* <https://www.justice.gov/atr/case-document/indictment-80>.

¹¹¹ *See* footnote 110.

¹¹² The KFTC noted that “both LG Electronics and Philips engaged in the CRT business before transferring their respective businesses to LPD” but declined to include them on the defendant list. *See* KFTC Decision at footnote 4.

¹¹³ Orion was implicated by the KFTC but not charged. As the KFTC explained, “Although Orion Electronics Co., Ltd. (hereinafter referred to only as “Orion”) participated in the joint actions related to this case, the liquidation process started in July of 2003. After the company was dissolved on October 31, 2005, the dissolution registration was completed. Due to the fact that the statute of limitations expired, the company was excluded in the defendant list of this case.” *See* KFTC Decision at footnote 4.

Entity	U.S. DOJ	European Commission	Japan Fair Trade Commission (JFTC)	Korea Fair Trade Commission (KFTC)	Czech Competition Authority (CCA) ¹⁰⁶
Panasonic		CPT: 7/15/1999–3/31/2003			CPT: 1998–2004
Toshiba		CPT: 5/16/2000–3/31/2003			CPT: 1998–2004
MT Picture Display		CPT: 4/1/2003–6/12/2006	CPT: starting 5/22/2003 ¹¹⁴		CPT: 1998–2004

II.D. Previous cartel activity

- (36) The economics literature recognizes that there are challenges associated with achieving effective collusion and that there can be learning involved with figuring out how to collude effectively.¹¹⁵ Thus, when the experience of effectively colluding already resides within a corporate entity, that supports the possibility that collusion could be effective in additional product lines. For example, my research recognizes that corporate structure (e.g., sales force incentives) can affect the effectiveness of collusion. Thus, the observation that there have been other cartels within the same corporate entity suggests to me that the corporate structure may accommodate collusion. In addition, evidence that two firms participated in a cartel in one product supports the conclusion that there are channels of communication between the firms and an absence of corporate structures, rules, or culture that would prevent collusive communication. The fact that firms have participated in multiple cartels and the associated policy implications of it are recognized in the academic literature and among enforcement authorities.¹¹⁶

¹¹⁴ The JFTC provided a slightly later start date for two of the specific MTPD entities (MT Picture Display (Malaysia) Sdn. Bhd.: “no later than February 16, 2004”; MT Picture Display (Thailand) Co., Ltd.: “no later than April 23, 2004.”

¹¹⁵ See, e.g., William E. Kovacic, Robert C. Marshall, Leslie M. Marx, and Matthew E. Raiff, “Lessons for Competition Policy from the Vitamins Cartel.” In *The Political Economy of Antitrust*, vol. 282, eds. Vivek Ghosal and Johan Stennek, 149–76. New York: Elsevier, 2007; Edward J. Green. Robert C. Marshall, and Leslie M. Marx. “Tacit Collusion in Oligopoly.” In *Oxford Handbook of International Antitrust Economics*, vol. 2, eds. Roger D. Blair and D. Daniel Sokol. Oxford University Press, 464–97 (2015).

¹¹⁶ For example, the U.S. programs “directed at multi-product colluders include Amnesty Plus, introduced in 1999, under which a firm being prosecuted for collusion that has not received leniency can qualify for reduced fines if it applies for leniency in a separate product in which it is also engaged in collusion, and Penalty Plus, under which the failure to report collusion in separate products can put firms at risk for increased penalties should they later be prosecuted for collusion in those products.” Leslie M. Marx, Claudio Mezzetti and Robert C. Marshall, “Antitrust Leniency with Multiproduct Colluders.” *American Economic Journal: Microeconomics* 7(3), 205–240 (2015).

“Patterns of past behavior sometimes can serve to illuminate the cause of otherwise ambiguous conduct. Some decisions have permitted an inference of conspiracy to be supported by proof that the defendants previously have violated the antitrust laws by engaging in illegal conspiracies. To some courts, a pattern of past violations—especially when the involve largely the same industry circumstances as the case at hand—has served as a reliable indication that the observed parallelism is neither accidental nor solely a consequence of conscious interdependence.” See William E. Kovacic, “The identification and proof of horizontal agreements under the antitrust laws,” *The Antitrust Bulletin*: Spring 1993, 5-81 at 44.

Wouter P.J. Wils, “Recidivism in EU Antitrust Enforcement: A Legal and Economic Analysis” *World Competition: Law*

(37) Given this background in the economics literature, I considered the previous cartel activity of the Co-conspirators. Many of the Co-conspirators as well as their related entities have been implicated for colluding in other products. Examples of other cartels involving the Co-conspirators in this matter, and in some cases their related corporate entities, include the following (pled guilty to price-fixing charges in the United States unless noted):

- Chunghwa: TFT-LCDs¹¹⁷
- Hitachi: TFT-LCDs,¹¹⁸ auto parts (alternators and starters),¹¹⁹ electrolytic capacitors,¹²⁰ DRAM (EC),¹²¹ optical disk drives,¹²² gas-insulated switchgear (EC),¹²³ power transformers (EC),¹²⁴ smart card chips (EC)¹²⁵
- LG/Philips/LPD: Optical disk drives,¹²⁶ lithium-ion batteries,¹²⁷ TFT-LCDs,¹²⁸ smart card chips (EC)¹²⁹

and Economics Review, Vol. 35, No. 1, March 2012. Available at SSRN: <http://ssrn.com/abstract=1957088>.

¹¹⁷ Chunghwa Picture Tubes, Ltd., a named Co-conspirator in this matter, pled guilty to fixing prices of TFT-LCDs from “on or about Sept. 14, 2001, to on or about Dec. 1, 2006.” <https://www.justice.gov/atr/case-document/plea-agreement-71>.

¹¹⁸ Hitachi Displays, Ltd., one of the named Co-Conspirators in this matter, pled guilty to fixing prices for TFT-LCDs and paid a \$31 million fine in the United States. *See* <https://www.justice.gov/atr/case-document/plea-agreement-163>.

¹¹⁹ Hitachi Automotive Systems, Ltd. pled guilty to fixing prices of several auto parts. *See* <https://www.justice.gov/atr/case/us-v-hitachi-automotive-systems-ltd>. In Europe, however, Hitachi Ltd., one of the named Co-conspirators here, was implicated for its “direct participation” in the conspiracy. *See* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52016XC0419%2801%29&from=EN>.

¹²⁰ Hitachi Chemical Co., Ltd. pled guilty to fixing prices. *See* <https://www.justice.gov/atr/case/us-v-hitachi-chemical-co-ltd>.

¹²¹ Hitachi Ltd, one of the named Co-conspirators here, was implicated by the EC for its direct participation in the DRAM cartel from Nov. 9, 1998 until Feb. 28, 2001 and for indirect participation through Elpida from Mar. 1, 2001 until June 15, 2002. Hitachi Europe Ltd. was also implicated by the EC (*see* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52011XC0621%2803%29&from=EN>).

¹²² Hitachi-LG Data Storage, Inc., a joint venture of Hitachi, Ltd. (one of the named Co-conspirators in this matter) and LG Electronics, Inc., pled guilty to fixing prices of optical disk drives. *See* <https://www.justice.gov/atr/case-document/plea-agreement-164>.

¹²³ Hitachi Ltd., one of the named Co-conspirators here, and Hitachi Europe Ltd. were implicated by the EC. *See* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52008XC0110%2801%29&from=EN>.

¹²⁴ Hitachi Ltd, one of the named Co-conspirators here, and Hitachi Europe Ltd. were implicated by the EC. *See* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52009XC1205%2801%29&from=EN>.

¹²⁵ Renesas Electronics Corporation, “at the time a joint venture of Hitachi Ltd and Mitsubishi Electric Corporation” was implicated by the European Commission. According to the Commission, “Renesas (and its joint venture parent companies Hitachi and Mitsubishi) received full immunity, as it was the first to reveal the existence of the cartel to the Commission, avoiding a fine of more than €51 million for its participation in the infringement.” *See* http://europa.eu/rapid/press-release_IP-14-960_en.htm and http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_39574.

¹²⁶ Hitachi-LG Data Storage, Inc., a joint venture of Hitachi, Ltd. (one of the named Co-conspirators in this matter) and LG Electronics, Inc., pled guilty to fixing prices of optical disk drives. *See* <https://www.justice.gov/atr/case-document/plea-agreement-164>.

¹²⁷ LG Chem, Ltd. pled guilty to fixing prices of “cylindrical lithium ion battery cells. *See* <https://www.justice.gov/atr/case/us-v-lg-chem-ltd>.

¹²⁸ LG Display Co., Ltd. and LG Display America, Inc. pled guilty to fixing prices of TFT-LCD panels. *See* <https://www.justice.gov/atr/case/us-v-lg-display-co-ltd-and-lg-display-america-inc>.

- Panasonic: Auto parts,¹³⁰ compressors,¹³¹ U.S. amnesty applicant in capacitors¹³²
- Toshiba: DRAM (EC)¹³³, gas-insulated switchgear (EC),¹³⁴ optical disk drives (EC),¹³⁵ power transformers (EC).¹³⁶

(38) Mitsubishi specifically has been implicated by the DOJ and/or the EC in a number of other cartels, including several with the same co-conspirators as in this matter. For automotive parts (alternators and starters in the EU), DRAM, smart card chips, and gas-insulated switchgear, Mitsubishi Electric Corporation was specifically implicated and/or pled guilty for its role in the cartel.

- Auto parts: Mitsubishi¹³⁷ and Hitachi implicated, among others
- DRAM (EC): Mitsubishi,¹³⁸ Hitachi, and Toshiba implicated, among others
- Smart card chips (EC): Mitsubishi,¹³⁹ Hitachi, and Philips implicated, among others
- Gas-insulated switchgear (EC): Mitsubishi,¹⁴⁰ Hitachi, and Toshiba implicated, among others
- Power cables (EC): Mitsubishi¹⁴¹ and Hitachi implicated, among others

¹²⁹ Philips France S.A.S. was implicated by the EC for its participation in the smart card chips cartel. As of August 25, 2016, there is not a public version of the EC's findings for that cartel. *See* http://europa.eu/rapid/press-release_IP-14-960_en.htm and http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_39574.

¹³⁰ Panasonic Corporation, a named Co-conspirator in this matter, pled guilty to fixing prices of a number of automotive parts, including "steering wheel switches, tum switches, wiper switches, combination switches, and door courtesy switches," "steering angle sensors," and "automotive high intensity discharge ballasts." *See* <https://www.justice.gov/atr/case-document/file/507161/download>.

¹³¹ Panasonic Corporation, a named Co-conspirator in this matter, pled guilty to fixing prices of refrigeration compressors. *See* <https://www.justice.gov/atr/case-document/panasonic-plea-agreement>.

¹³² <http://www.law360.com/articles/707956/current-capacitor-investigation-may-be-tip-of-large-iceberg>.

¹³³ Toshiba Corp, a named Co-conspirator in this matter, and Toshiba Electronics Europe GmbH were implicated by the EC for their participation in the DRAM cartel from July 1, 1998 until Apr. 22, 2002 (*see* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52011XC0621%2803%29&from=EN>).

¹³⁴ Toshiba Corp, a named Co-conspirator in this matter, was implicated by the EC for its role in the cartel from Apr. 15, 1988 to May 11, 2004. *See* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52008XC0110%2801%29&from=EN>.

¹³⁵ Toshiba Samsung Storage Technology was implicated by the EC for its participation in a cartel to fix the price of optical disk drives. Toshiba Samsung Storage Technology is an international joint venture company of Toshiba Corporation and Samsung Electronics Co., Ltd. (*see* <http://www.tsstodd.com/eng/company/overview/>). As of August 25, 2016, there is not a public version of the EC's findings for that cartel. *See* http://europa.eu/rapid/press-release_IP-15-5885_en.htm.

¹³⁶ Toshiba Corp, a defendant in this matter, was implicated by the European Commission for its role in the cartel from June 9, 1999 to May 15, 2003. *See* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52009XC1205%2801%29&from=EN>.

¹³⁷ <https://www.justice.gov/atr/case/us-v-mitsubishi-electric-corporation> and <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52016XC0419%2801%29&from=EN>.

¹³⁸ <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52011XC0621%2803%29&from=EN>.

¹³⁹ http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_39574.

¹⁴⁰ <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52008XC0110%2801%29&from=EN>

¹⁴¹ Mitsubishi Cable Industries, Ltd was implicated by the EC for its role in the cartel. *See* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52014XC0917%2801%29&from=EN>

Expert Report of Leslie M. Marx, PhD

- Elevators/Escalators (EC): Mitsubishi¹⁴² and others implicated

¹⁴² Mitsubishi Elevator Europe BV was named by the EC. *See* <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52008XC0326%2801%29&from=EN>.

III. Economics of collusion

- (39) Collusion, or “explicit collusion,” is an agreement to suppress rivalry among competitors that involves communication and/or transfers. This definition implies that the agreement is in the collective interest of the colluding firms and would not arise without coordination.
- (40) In 1964, Nobel Prize winner George Stigler published a paper, which is now a foundation of industrial organization economics, that discusses the common structures of a successful cartel.¹⁴³ Following Stigler, I have identified in my research the following building blocks for effective collusion: (1) pricing structures that enable colluding firms to suppress rivalry and implement price increases, (2) allocation structures that allow colluding firms to divide the collusive gain and reallocate resources among one another when things do not go as expected, and (3) monitoring and enforcement structures that facilitate monitoring and establish the threat of punishment for non-contrite deviant behavior.
- (41) Stigler (1964) identifies secret price cutting as the key problem that must be solved by a cartel.¹⁴⁴ If a cartel agrees to suppress rivalry, then each cartel member will consider whether it can secretly deviate from the agreement to obtain additional profits. Specifically, if the cartel has agreed to a price, then each member will consider whether it can secretly offer some buyers a slightly lower price, and thereby capture additional sales and additional profits.

III.A. Cartels seek to suppress rivalry

- (42) Cartels attempt to increase their profits by suppressing rivalry among the cartel firms. In a typical price-fixing conspiracy, the cartel firms agree on prices that are elevated relative to what they would otherwise have been and/or quantities that are reduced relative to what they would otherwise have been. Elevating prices and restricting quantity are effectively two sides of the same economic coin.

¹⁴³ Authors Green and Porter describe Stigler’s 1964 paper in their 1984 paper in *Econometrica* as a “classic paper” and motivate their own work based on his. George J. Stigler, “A Theory of Oligopoly,” *Journal of Political Economy* 72, no. 1 (1964): 44–61 (Stigler (1964)); Edward J. Green and Robert H. Porter, “Noncooperative Collusion under Imperfect Price Information,” *Econometrica* 52, no. 1 (1984): 87–100.

¹⁴⁴ “Stigler (1964) begins his analysis by noting that a cartel will want to increase profits through what he calls ‘pricing structures.’ . . . The next step in Stigler’s analysis is the keystone. If a cartel agrees to a pricing structure, and the cartel is enhancing profits relative to the absence of a cartel, then each cartel member will consider whether it can secretly deviate from the agreement to obtain additional profits. Specifically, if the cartel has agreed to a price, then each member will consider whether it can secretly offer some buyers a slightly lower price, and thereby capture additional sales and additional profits. The need to avert secret deviations by cartel members is the central problem facing a cartel. If there are substantial secret deviations from the cartel agreement, the cartel will fail. If the cartel can deter substantial secret deviations, the cartel can survive and potentially thrive. Thus, the focus of any cartel is the creation of structures that increase profits while averting secret deviations by members.” Marshall and Marx, *Economics of Collusion*, at 105–06.

Cartels can implement one or the other to achieve their goals, although the economic evidence of effective collusion can be stronger if both are present.

- (43) Cartels work to elevate prices by suppressing rivalry among their member firms. When rival firms have colluded to elevate prices relative to non-collusive levels, individual firms may have an incentive to undercut those elevated prices to capture incremental market share at still elevated prices. But this process of undercutting, if all firms followed their unilateral incentives to engage in it, would result in prices returning to their non-collusive levels. Thus, to achieve higher prices, the cartel must suppress member firms' incentive to behave as rivals.
- (44) Firms that are collectively attempting to elevate prices above non-collusive levels face a coordination problem. They typically need to agree on the elevated price level and/or put in place mechanisms that enable firms to know what prices they should charge and how they should deal with customers in order to support the goals of the cartel. In some cases, a cartel can operate through an agreement to restrict output without specifically discussing prices, because once output levels are reduced, the corresponding prices will be elevated even without coordination. Cartels often operate through a combination of both coordinated price increases and coordinated output reductions.¹⁴⁵
- (45) Information exchange plays a critical role in facilitating the suppression of rivalry by cartels. This can take the form of discussions of prices, resulting in agreements on prices (or ranges of prices) to be charged. It can also take the form of discussions related to output levels, potentially including production levels and/or capacity levels, but it is not limited to these two forms.

III.B. Cartels allocate gains so all participants benefit from the suppression of rivalry

- (46) Cartels have an incentive to ensure that all participants in the cartel benefit from the collusive suppression of rivalry and so are willing to participate. In some cases, the benefits of collusion naturally flow to the individual colluding firms in a way that is sufficient to support continued participation in the cartel. In these cases, explicit agreement on allocation structures may not be required because an acceptable allocation of the collusive gain is provided by other aspects of the agreement and/or the marketplace. In other cases, an explicit division of the collusive gain forms a part of the collusive conduct. There are many examples of cartels using market share agreements, customer allocations, and/or geographic allocations to achieve their target allocation of collusive benefits among cartel members. For example, some or all colluding firms might specifically agree to a particular division of markets or allocation of customers.

¹⁴⁵ Other pricing structures include modifying within-firm incentives to support the objectives of the cartel.

III.C. Cartels try to deter deviations from agreements through monitoring and to address deviations if they are detected

- (47) As I described earlier, individual parties to the collusive conduct often have an incentive to deviate from (i.e., undercut) the collusion. Cartels use monitoring and enforcement structures to minimize, detect, and punish intentional deviations, including (1) meetings, phone calls, emails, and other communications among cartel members and (2) the reporting of information, such as prices, output, and capacities, relevant for monitoring compliance with the cartel agreement.¹⁴⁶ The economic literature has analyzed a wide range of potential punishments a cartel can use.¹⁴⁷ One common threat of punishment is the implicit threat that deviations will cause the collusion to break down and lead to a return to less profitable non-collusive conduct (i.e., competition).
- (48) Economists have recognized that “[t]here are, however, numerous cartels for which cheating was an issue either intermittently or throughout the life of the cartel. Thus, for many of the cartels cheating was a fact of life—a reality of running the organization—but not a cause of death.”¹⁴⁸ Recent academic research has shown that some business stealing, which may look like cheating or even competition to an outsider, can exist within a cartel equilibrium.¹⁴⁹
- (49) Deviations from a cartel agreement can be deterred through monitoring. If a cartel firm knows that a deviation may be detected by the other cartel members, then it will have reduced incentive to deviate because non-compliance with cartel agreements can lead to a breakdown of the collusive activity and a return to lower, non-collusive profits.

¹⁴⁶ Exchanging information can facilitate monitoring by helping the cartel “distinguish between the events resulting from demand variability and changes in competitors’ prices.” See Margaret C. Levenstein and Valerie Y. Suslow, “Breaking Up Is Hard to Do: Determinants of Cartel Duration,” *Journal of Law and Economics* 54, no. 2 (2011): 459.

Recent experimental economics research has shown that communication—face-to-face communication, in particular—can be even more effective than punishments in sustaining cooperation. Other research has shown that “social approval” and fostering a sense of “community” within a group can be effective at sustaining cooperation without an appeal to punishments. Ananish Chadhuri, “Sustaining Cooperation in Laboratory Public Goods Experiments: A Selective Survey of the Literature,” *Experimental Economics* 14, no. 1 (2011): 47–83.

¹⁴⁷ Margaret C. Levenstein and Valerie Y. Suslow, “What Determines Cartel Success?” *Journal of Economic Literature* 44, no. 1 (2006): 46. (Levenstein and Suslow (2006))

See also Ian Ayres, “How Cartels Punish: A Structural Theory of Self-Enforcing Collusion,” *Columbia Law Review* 295, no. 87 (1987): 303 (“Nevertheless, a cartel may have difficulty creating such beliefs in large part because the pricing punishment is so damaging to the cartel’s rank and file. Cartels thus will strive to construct more efficient punishments—that is, punishments in which the breaching firms will be forced to absorb a greater proportion of the punishment cost than the punishing firms”).

¹⁴⁸ Margaret C. Levenstein and Valerie Y. Suslow, “Breaking Up Is Hard to Do: Determinants of Cartel Duration,” *Journal of Law and Economics* 54, no. 2 (2011): 470. See also p. 477 (“Cartels do not want to disrupt collusion...even sometimes when they know that a firm has cheated”) and 485 (“Many cartels suffer from a little cheating; this cheating does not result in punishment, let alone cartel death”).

¹⁴⁹ B. Douglas Bernheim and Erik Madsen, “Price Cutting and Business Stealing in Imperfect Cartels,” 2016, available at https://www.gsb.stanford.edu/sites/gsb/files/working-papers/imperfect_cartels_0.pdf.

III.D. Distinguishing pro-competitive and pro-collusive information exchange

- (50) Generally speaking, exchanging information between competitors can have both procompetitive and anticompetitive aspects. An extensive body of academic research studies whether any specific type of information exchange is procompetitive or anticompetitive.¹⁵⁰ Fundamentally, this literature asks two questions:

1. Can this exchange of information facilitate collusion?
2. Can this exchange of information enhance efficiency?

While much of the academic interest is focused on actions that may both facilitate collusion and enhance efficiency, practices that facilitate collusion without enhancing efficiency are generally viewed as anticompetitive. There are numerous examples in the economic literature of information exchanges that may facilitate collusion without enhancing efficiency. For example, communications between competitors about future, current, or historical prices charged to customers have an obvious role supporting collusion,¹⁵¹ and it is difficult to identify any resulting efficiency.¹⁵² Exchanging specific data on sales and profitability may have a similar impact as exchanging price information in that these data provide an effective way to monitor compliance with an understanding to suppress rivalry without enhancing efficiency.¹⁵³

- (51) The procompetitive and anticompetitive aspects of information sharing are also recognized by the U.S. antitrust enforcement agencies (namely, the DOJ and Federal Trade Commission (FTC)) and addressed in a joint publication entitled “Antitrust Guidelines for Collaborations Among Competitors.”¹⁵⁴ The following statements from the Guidelines describe in large part the difference between information sharing that may be pro-competitive or potentially anti-competitive:

¹⁵⁰ See, e.g., Per Baltzer Overgaard and H. Peter Mollgaard, “Information Exchange, Market Transparency, and Dynamic Oligopoly,” in *Issues in Competition Law and Policy* vol. 2, 1241–68 (Chicago: ABA Publishing, 2008).

¹⁵¹ See, e.g., Joseph E. Harrington and Andrzej Skrzypacz, “Private Monitoring and Communication in Cartels: Explaining Recent Collusive Practices,” *American Economic Review* 101, no. 6 (2011): 2425–49; David Rahman, “The Power of Communication,” *American Economic Review* 104, no. 11 (2014): 3737–51.

¹⁵² One exception to this is Chaim Fershtman and Ariel Pakes, “A Dynamic Oligopoly with Collusion and Price Wars,” *RAND Journal of Economics* 31, no. 2 (2000): 207–36. The authors argue (at p. 210) that collusion can increase consumer welfare when it leads producers in an industry to offer “both more and higher-quality products to consumers, albeit often at a higher price.”

¹⁵³ Awaya and Krishna (2016) show how “unverifiable communication about past sales can indeed facilitate collusion,” providing “support for the idea that even unverifiable communication within a cartel facilitates greater collusion and is detrimental for society.” Yu Awaya and Vijay Krishna, “On Communication and Collusion,” *American Economic Review* 106, no. 2 (2016): 286, 307.

¹⁵⁴ https://www.ftc.gov/sites/default/files/documents/public_events/joint-venture-hearings-antitrust-guidelines-collaboration-among-competitors/ftcdojguidelines-2.pdf. (Guidelines).

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- "...sharing of information among competitors may be procompetitive and is often reasonably necessary to achieve the procompetitive benefits of certain collaborations; for example, sharing certain technology, know-how, or other intellectual property may be essential to achieve the procompetitive benefits of an R&D collaboration."¹⁵⁵
- "Other things being equal, the sharing of information relating to *price, output, costs, or strategic planning* is more likely to raise competitive concern than the sharing of information relating to less competitively sensitive variables. Similarly, other things being equal, the sharing of information on *current operating and future business plans* is more likely to raise concerns than the sharing of historical information. Finally, other things being equal, the *sharing of individual company data* is more likely to raise concern than the sharing of aggregated data that does not permit recipients to identify individual firm data"¹⁵⁶ (emphasis added).

- (52) In a competitive environment, a rival can take advantage of competitively sensitive information such as prices, quantity, capacities, costs, and strategic plans, which is why this information is typically held close by firms. For example, if Firm A told its only competitor, Firm B, that it (i.e., Firm A) was operating at full capacity utilization and thus could not manufacture additional units of a product, Firm B could quote a higher price to a new customer because it would know by virtue of the information exchange that Firm A would not be able to supply the product. Similarly, if Firm C told Firm D the price it was offering to a customer (e.g., \$10), Firm D would know exactly the price (e.g., just below \$10) that it would have to bid to steal the business from Firm C. Thus, in a competitive environment it would not be in Firm A or C's unilateral self-interest to reveal this information to Firms B and D, respectively.
- (53) Revealing competitively sensitive information to a horizontal competitor is often pro-collusive. Cartel members exchange competitively sensitive information for many reasons, including to facilitate agreements on prices and/or quantities (the pricing structures described above) and to monitor and enforce their agreements. As I describe in more detail in Section IV below, the information exchanged between CRT cartel members, including Mitsubishi, is consistent with anticompetitive purposes. The many documented instances of inter-competitor communication that include the sharing of competitively sensitive information are contrary to the self-interest of the individual firms in the absence of an overarching agreement to suppress rivalry. The information exchange between CRT cartel members is the kind of information exchange that economics teaches would be valuable in supporting collusive conduct and is the kind of information exchange for which economics strains to offer any pro-competitive explanation. In general, when one is unlikely to observe certain conduct in the absence of collusion, the inference of collusion is strong when such conduct is observed. That is the case here.

¹⁵⁵ Guidelines at §3.31(b).

¹⁵⁶ Guidelines at §3.31(b).

III.E. Cartels take steps to remain undetected by limiting evidence of their existence

- (54) Collusion is typically illegal, so firms engaged in collusive conduct have an incentive to limit evidence of its existence and avoid detection. This incentive is widely recognized within the academic literature,¹⁵⁷ and cartels have used many different means to hide their existence.¹⁵⁸ In addition, colluding firms have an incentive to disguise the existence of a cartel from buyers to limit the extent to which buyers try to resist cartel price increases.¹⁵⁹ For example, in the Vitamins cartel and the Electrical and Mechanical Carbon and Graphite Products cartel, the colluding firms agreed on artificial justifications for the cartel price increases that they would present to their buyers to help the cartel avoid buyer resistance and detection.¹⁶⁰

¹⁵⁷ See, e.g., Joseph E. Harrington and Joe Chen, “Cartel Pricing Dynamics with Cost Variability and Endogenous Buyer Detection,” *International Journal of Industrial Organization* 24, no. 6 (2006): 1185 (“In light of the illegality of collusion, firms don’t just want to achieve prices that raise profit and are internally stable; they also want to avoid creating suspicions that a cartel has formed.”); Joseph E. Harrington, “Cartel Pricing Dynamics in the Presence of an Antitrust Authority,” *RAND Journal of Economics* 35, no. 4 (2004): 652 (“In that the explicit coordination of price and quantity is a violation of antitrust law, a cartel wants to raise price in such a manner as to avoid creating suspicions that a cartel has formed. Firms want to raise prices but not suspicions that they are coordinating their behavior.”); Robert H. Porter, “Detecting Collusion,” *Review of Industrial Organization* 26, no. 2 (2005): 150 (“[C]onspirators may act to create the appearance of competition in order to avoid detection.”); Leslie M. Marx, Claudio Mezzetti, and Robert C. Marshall, “Antitrust Leniency with Multi-Market Colluders,” *American Economic Journal: Microeconomics* 7(3), 205–40 (2015); Leslie M. Marx and Claudio Mezzetti, “Effects of Antitrust Leniency on Concealment Effort by Colluding Firms,” *Journal of Antitrust Enforcement* 2(2), 305–32 (2014).

¹⁵⁸ As the EC wrote in its provisional decision re CRTs, “The anti-competitive object of the parties is also illustrated by the fact that they took deliberate actions to conceal their meetings and to avoid detection of their arrangements (see Recital (114)). By way of example, the participating companies made efforts to avoid being in possession of anticompetitive documents and they attempted to hide the illicit content of the contacts by not taking minutes at all.” EC CRTs Decision, ¶ 694.

¹⁵⁹ Leslie M. Marx, Vikram Kumar, Robert C. Marshall, and Lily Samkharadze, “Buyer Resistance for Cartel versus Merger,” *International Journal of Industrial Organization* 39 (2015): 71–80.

¹⁶⁰ See EC decision in electrical and mechanical carbon and graphite products at ¶ 108 (“With regard to justifications for price increases, a local meeting in the Netherlands on 19 December 1995 came up with the following agreed explanations to ‘justify’ an impending price increase”) and EC decision in amino acids at ¶ 164 (“The participants agreed on the explanation to be given to buyers.”).

IV. Conduct of the CRT cartel

- (55) As I described in Section III, communicating and exchanging information between firms is one of the key features of explicit collusion. In an oligopoly without collusion, a firm can and does anticipate how a rival would respond to its actions and adjusts its behavior accordingly.¹⁶¹ For example, a firm in an oligopoly may decide not to aggressively cut prices if it believes that its rivals will reduce their prices in response to avoid losing customers. In this (albeit simple) example, the effect of the initial price cut would be lower prices for all firms without allowing any firm to capture new customers. Therefore, the firms may decide to maintain (or not reduce) prices based on their expectations of how their rivals would respond and, importantly, *without* communicating to one another about their intentions. This is different than an explicitly collusive outcome because there is no communication or other interaction between the firms directing the outcome.¹⁶²
- (56) The evidence in this matter is not consistent with the non-collusive oligopoly conduct I just described. The conspirators here engaged in extensive communication and information sharing, including the sharing of competitively sensitive information on current pricing, future pricing, current production levels, and future production levels.¹⁶³ The CRT conspirators communicated this information in various ways, including structured group meetings involving personnel all the way up to the CEO level, bilateral and multilateral communications used to disseminate information from the group meetings,¹⁶⁴ and “regular private communications” between group members.¹⁶⁵ The goal of these

¹⁶¹ This is different from what is referred to in textbooks as perfect competition, where suppliers are so small relative to the market that the actions of any one supplier are not relevant for other suppliers.

¹⁶² Paul M. Sweezy, “Demand under Conditions of Oligopoly,” *The Journal of Political Economy* 47, issue 4 (August 1939, 568-573; Edward J. Green, Robert C. Marshall, and Leslie M. Marx, “Tacit Collusion in Oligopoly,” In *Oxford Handbook of International Antitrust Economics*, vol. 2, eds. Roger D. Blair and D. Daniel Sokol, Oxford University Press, 464-97 (2015).

¹⁶³ As described in more detail in Section IV.C.3, not only did the Co-conspirators exchange competitively sensitive information on production, including planned factory shutdowns, they submitted to factory audits from other Co-conspirators to demonstrate their adherence.

¹⁶⁴ Examples of bilateral meetings include:

- CHU0028305E: September 22, 1995 meeting between Chunghwa and Toshiba. A “remark” from the meeting asks Toshiba to “double check” regarding the number of production lines Mitsubishi is operating.
- CHU00028385 – 87 (Exhibit 1135EF): August 21, 1998, meeting between Chunghwa and Hitachi exchanging information on Hitachi’s “current 17”/19” CDT production status” and “current selling price,” including comments from Hitachi that it “...welcomes the price increase. He personally believes that if there can be another increase in October, HTC would follow.”
- CHU00029185-88: June 21, 1999, meeting attended by Samsung SDI, LG, Orion, Thai CRT, and Chunghwa describing “team leaders” and “agreed price” for individual customers. The notes indicate a follow-up meeting with at least Samsung SDI and Panasonic: “...Mr. Park [of Samsung SDI] said he would have a meeting on 6/23 with MMEC [Panasonic] related staff. He would also arrange something like a Top Management meeting next week to explain to MMEC the determination and achievement of this current price-up plan and ask MMEC FLW the new prices.”
- CHU00029228-230 (Exhibit 1144EF): Notes from a May 10, 1999, meeting stating that “LG and [Orion] will contact TDDI [TSB Indonesia] and ask TDDI to FLW the price agreement.”

communications was, in the words of one witness from Chunghwa, to “avoid vicious competition from cutting into the market price and hurting everybody.”¹⁶⁶ Put slightly differently by another Chunghwa participant, “In order to prevent serious losses, to maintain long-term stability in the industry, the best way is for everyone to maintain a price.”¹⁶⁷ Said yet a third way, “we hoped...to achieve what we have developed as consensus. We hope to effectively maintain and raise the prices. Don't undercut each other among ourselves.”¹⁶⁸

IV.A. Avoiding detection and the availability of economic evidence

- (57) It is typically difficult to obtain detailed evidence of a cartel's operation, because participants generally know that their actions are illegal and take steps to remain undetected. To reduce the probability of detection and punishment, cartel participants have an incentive to limit the creation of evidence of their actions (i.e., the “paper trail”).¹⁶⁹ In the case of the CRT cartel, though, some cartel members took and preserved detailed minutes from their meetings and then circulated those minutes within their firms for approval. While there are detailed notes from many of the CRT cartel's meetings, there is no guarantee that the evidence available reflects the full record of communications between members of the CRT cartel. The Co-conspirators made statements indicating that they recognized the antitrust implications of their communication/coordination, took steps to conceal it, and may otherwise have covered their tracks to avoid detection. At the time of their meetings, the conspirators' notes discuss that their coordination and communication raised antitrust concerns. Chunghwa meeting minutes from a working-level glass meeting reflect that someone crossed out by hand the names of the “Attending Parties,” which included LPD, Samsung SDI, IRICO, and Chunghwa, and note that “holding meetings with peers in the industry violates free market mechanism” and “it is not suitable to leave any evidence on paper.”¹⁷⁰ Meeting notes from a “CDT Industry Meeting” on July 18, 1998, indicate that the Japanese companies showed “[c]aution against

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- SDCRT-0086434E-36E: Notes from an October 26, 1998, meeting produced by Samsung SDI reflect coordination with the Japanese:
 - “Opinion on the increase in price of 17” by Japan:
 - First of all, the adjustment of Japanese manufacturers' capacity for 17” monitors is preconditioned
 - In the event that Japanese manufacturers increase the price level first,
 - The 5 companies will reach an agreement to increase the price level.
 - Samsung will deliver the 5 companies' opinions (to Matsushita)”

¹⁶⁵ CHU00020660E.

¹⁶⁶ Deposition of S.J. Yang (Chunghwa) Deposition, February 22-26, 2013 (S J. Yang (Chunghwa) Deposition), p. 333-4.

¹⁶⁷ C.C. Liu (Chunghwa) Deposition, pg. 51

¹⁶⁸ C.C. Liu (Chunghwa) Deposition, pg. 345-346.

¹⁶⁹ See the discussion in Section III.E above.

¹⁷⁰ CHU00578883.01E-5E (Exhibit 1871EF). This is just one of many notes in this particular document that reflect text that has been crossed out by hand. For example, “~~Heard that~~ Philip's China market demand is strong” and “~~working-level glass meeting~~” (modifications in original).

ANTITRUST LAWS.”¹⁷¹ Meeting minutes produced by Samsung SDI from a March 8, 1999, meeting include a note at the top to “Please dispose of this material after reading it.”¹⁷²

- (58) In one of its interrogatory responses, Mitsubishi states that “[o]ther responsive documents or information were discarded in the ordinary course of business” before a litigation hold was issued in November 2011.¹⁷³ As a result, there may be particular gaps in the evidentiary record for Mitsubishi. Because we may only have a partial view of the evidence of any particular structure used by the cartel, a lack of extensive evidence for that structure is not and should not be taken as a demonstration that the structure in question was not a part of the cartel’s conduct.

IV.B. Information exchanges and cartel meetings

- (59) There are records and minutes of discussions between the CRT conspirators dating back to 1995. For example, LG and Chunghwa met in May 1995, and the “main point of this visit to [Chunghwa] by

¹⁷¹ SDCRT-0086416E-8E. The full context of the meeting notes is as follows:

“Visited Matsushita [Panasonic] July 16 [two days before the meeting described in the notes] as the *representative of Japanese cathode ray tube* (CRT) representative and provided information on the agreements reached by 5 Korean and Taiwan companies

- Expressed their *intention to participate actively*
- Caution against ANTITRUST LAWS”

(CAPS in original, italics added).

¹⁷² SDCRT-0086563E-6E;

For other examples, *see*:

- SDCRT-0086672-74: “The industry meetings should remain confidential considering the international regulation of antitrust laws”
- CHU00660717 – 27 (Exhibit 1198): slides include a bullet on the “method to avoid anti trust law”
- MTPD-0038856-59 (Exhibit 801E): In an email marked “*Highly Confidential/Destroy after Reading*”, the author from Panasonic wrote, “I am reporting on the substance of information about SDI and LPD I obtained on November 28, 2003, as follows. Please treat this matter as *highly confidential*, and please keep the fact that this meeting, meeting minutes, and so on exists as *highly confidential*.”
- MPTD-0497049 – 50 (Exhibit 1416E): In an email with “*Extremely Sensitive / Destroy After Reading * ASEAN Meeting (18May04)” as the subject, the author from Panasonic wrote, “I accompanied Yasukawa GM and Tomori GM to the ASEAN Small/Mid-Size Meeting on May 18 (Tuesday). I am reporting on the content. There is no password protection, but please treat the substance as extremely sensitive, and do not forward or save this message. It is being sent only to the 14 individuals listed above.”
- TSB-CRT-00041722E: An internal Toshiba e-mail with the subject line “CDT Information Important Destroy After Reading.”

¹⁷³ Specifically, Mitsubishi Electric issued its litigation hold on Nov. 9, 2011. Further, Mitsubishi Electric states in its interrogatory responses that:

- “In 1998, Mitsubishi Electric exited the CPT business. As a result, any responsive documents related to Mitsubishi Electric’s CPT business were likely discarded in the ordinary course of business, before Mitsubishi Electric issued its Litigation Hold on Nov. 9, 2011.
- “In or about 2000, Mitsubishi Electric transferred its CRT monitor business, along with *all relevant documents*, to a joint venture called NEC-Mitsubishi Electronics Display of America, Inc. (“NMV”). In 2005, Mitsubishi Electric transferred its ownership interest in NMV to NEC Corporation” (emphasis added).

See Mitsubishi Electric’s Fourth Supplemental Response to Direct Purchaser Plaintiffs’ Interrogatories at 6.

[LG] was to discuss the background for a CPT/CDT price increase, and the price increase range as well as to exchange market information.”¹⁷⁴ The same meeting minutes reflect a meeting earlier in 1995 between “SAMSUNG” and LG in Korea at which Samsung “plans to raise the price in July by around 10% and asked Goldstar to follow.”¹⁷⁵ According to the minutes, Chunghwa “explained the price increase actions of CPT Group,” noting that “[a]lthough it was difficult to raise the price, due to the tube shortage, the major customers accepted anyway.”¹⁷⁶ These initial meetings took place “at least one time a month” although “there were times that we meet every one and a half months” because of “some delay or some engagement of the attendees.”¹⁷⁷

- (60) In 1997, the meetings took on a more formal structure that came to be known as the “glass” meetings or GSM (“glass standardized meetings”) meetings. By that time, “almost all the CEOs of all the CRT manufacturers began to meet regularly.”¹⁷⁸ David Chang of Philips was credited with creating a more formal, tiered approach to the meetings, including “top-level” or “green” meetings, “management-level meetings,” and “working-level meetings.”¹⁷⁹ The “green” meetings¹⁸⁰ were typically attended by company “CEOs or someone who were equivalent of the CEO level”¹⁸¹ and were at a higher level and

¹⁷⁴ CHU00028933.01E–45E, Exhibit 1287EF.

¹⁷⁵ CHU00028933.01E–45E, Exhibit 1287EF.

¹⁷⁶ CHU00028933.01E–45E, Exhibit 1287EF.

¹⁷⁷ C.C. Liu (Chunghwa) Deposition p. 49. Additional descriptions of the cartel’s early meetings can be found in:

- SDCRT-0086208E (Exhibit 652EF) (notes from a February 14, 1995, meeting attended by Samsung SDI, Orion, and LG (Goldstar).
- CHU00028565E (notes from a March 17-18, 1995, CRT Manufacturers Meeting attended by Samsung SDI, LG (Goldstar), Orion, and Chunghwa)
- CHU00028877E (Exhibit 1318E) (notes from a March 22, 1995, meeting attended by Chunghwa and Samsung SDI).
- CHU00028933 (Exhibit 1287EF) (notes from a May 29, 1995, meeting attended by Chunghwa and LG)
- CHU00028869E–72E (Exhibit 1288EF) (notes from an August 16, 1995, meeting attended by Samsung SDI and Chunghwa)
- CHU00028311 (Exhibit 1110E) (notes from a September 7, 1995, meeting attended by Chunghwa and Toshiba).
- CHU00028851.01E–2.02E (Exhibit 1855E) (notes from an October 5, 1995, meeting attended by Samsung SDI and LG).
- HDP-CRT00025646E (Exhibit 1533E) (internal Hitachi email on January 17, 1996 reflecting a meeting with Samsung Electronics Japan marked “handle with care/destroy after reading”).
- CHU00028972 (notes from a March 4, 1996, meeting attended by Chunghwa and Orion)
- CHU00028400 (Exhibit 1114E) (notes from a September 23, 1996, meeting attended by Chunghwa and Hitachi).
- CHU00028289E and CHU00028291E (Exhibit 1784E) (notes from two meetings between Chunghwa and Toshiba on October 3, 1996, and October 9, 1996).

¹⁷⁸ C.C. Liu (Chunghwa) Deposition pp. 52-53.

¹⁷⁹ C.C. Liu (Chunghwa) Deposition, pp. 48-56, 73-5, 366-7.

¹⁸⁰ The meetings were referred to as the “green” meetings because the executives often played golf together before meeting. See Jim Smith (Philips) Deposition, p. 57.

¹⁸¹ Jae In Lee (Samsung SDI) Deposition (2013), pp. 26-7.

designed to develop “mutual trust” among the industry participants.¹⁸² They were generally held quarterly or every six months, although they could be held more frequently as needed.¹⁸³ Management-level meetings were typically “attended by people who are heads of the sales for people of sales VP or above” and occurred more frequently than the “green” meetings (as often as twice a month and later monthly).¹⁸⁴ At the management-level meetings, the firms reached “agreements” that included agreements on current prices, future prices, production levels and cutbacks, and capacity.¹⁸⁵ The primary goal of the working-level meetings was to “support the management-level meetings. So either they were held on the same day or somewhere close to the date” of the management meeting.¹⁸⁶ The specific tasks at the working-level meetings included exchanging and consolidating market and customer information for use at the management meetings¹⁸⁷ and following up/enforcing the “resolutions” and discussions from the management-level meetings. As an example, minutes from a “CRT Working Level Meeting” in May 1997 attended by Chunghwa, LG, Philips, Samsung SDI, and Orion indicate that C.C. Liu “first explained to the meeting attendees that the resolution by the top Managing Meeting are”:

¹⁸² C.C. Liu (Chunghwa) Deposition pp. 53-54, 75; Jae In Lee (Samsung SDI) Deposition (2013), pp. 26-7, 31-2; Jim Smith (Philips) Deposition pp. 56-7, 72-3.

An example agenda for a June 20, 2000 “Green Meeting,” as decided upon in a May 26, 2000 cartel meeting included:

07:30-12:00 Golf Game (limited to 4 people for each maker)
 12:00-13:00 Lunch (simple meal at Jin Ma Palace)
 13:00-14:30 SDI Marketing Survey Report
 14:30-17:30 All attending Presidents will visit CPTM, hosted by President Lin
 CDT Management meeting
 17:30-18:00 Dinner (simple dinner at Jin Ma Palace).
 18:00-21:00 CPT Management Meeting.

See CHU300031006 – 09 (Exhibit 1307E).

For other examples or discussions of CEO meetings, see SDCRT-0086445 - SDCRT-0086448, at 6445E; CHU00036384 - CHU00036385, at 6384.03E; SDCRT-0091524 - SDCRT-0091530, at 1525E; SDCRT-0086416 - SDCRT-0086418, at 6418; CHU00014230 - CHU00014231; C.C. Liu (Chunghwa) Deposition at 53:17 - 54:2; Jae In Lee (Samsung SDI) Deposition (2012) at 226:8 – 13.

¹⁸³ C.C. Liu (Chunghwa) Deposition, pp. 53-4; Jae In Lee (Samsung SDI) Deposition (2013), pp. 27.

¹⁸⁴ C.C. Liu (Chunghwa) Deposition, pp. 52-54.

See also C.C. Liu (Chunghwa) Deposition pp. 73-4 and S J. Yang (Chunghwa) Deposition pp. 50-2, 50-1, 59-60, 334-5.

¹⁸⁵ C.C. Liu (Chunghwa) Deposition, pp. 53-6:

Q. At the monthly group meetings, did you come to an understanding of what prices you would charge customers?

THE WITNESS: That would be the purpose of our meeting. Of course we did it.

Q. Okay. So, is it your understanding then that you came to an agreement with the participants on the prices to be charged for CRTs during this period of time?

THE WITNESS: Yes.

See also Jim Smith (Philips) Deposition, p. 73 ; For examples of management level meetings, See SDCRT-0086641 – 45 (Exhibit 1896E); SDCRT-0086563E-6E.

¹⁸⁶ Jae In Lee (Samsung SDI) Deposition (2013), p. 26.

¹⁸⁷ C.C. Liu (Chunghwa) Deposition, pp. 73-4; S J. Yang (Chunghwa) Deposition, pp. 50-2.

- Description of “bottom” prices that were “implemented since May 1”
- “Each CRT maker maintains its original M/S [market share]. Each maker should not grab orders formerly with other makers,” followed by a detailed review of sales by customer.¹⁸⁸

The minutes also reflect discussions among the parties about individual firms “not abiding” by the “price bottom line” and attempting to resolve differences among the parties.¹⁸⁹ The “conclusion” from the meeting appears to be that “[t]he meeting attendees will FLW [follow] the resolution of the high level meeting regarding the bottom price....”¹⁹⁰

- (61) The glass meetings were typically attended by representatives from Chunghwa, Samsung SDI, LG, Philips, Orion, and Thai CRT¹⁹¹ but included other Co-conspirators as well. For example, meeting minutes produced by Chunghwa identify several meetings attended by IRICO.¹⁹² Other meeting minutes reflect meetings attended by Panasonic/Matsushita.¹⁹³ Notes from a meeting in 2002 indicate that Toshiba “proactively brought up calling this working level GSM” even though “in the past, TSB [Toshiba] avoids this type of GSM.”¹⁹⁴ The notes from this meeting, taken by Chunghwa, reflect a detailed discussion of prices among the conspirators including that Toshiba “hopes to suggest setting Bare \$21 as the bottom line for customer quotes.”¹⁹⁵
- (62) In addition to the hierarchy of meetings based on employee level and topic, the glass meetings themselves were structured. A “chairman” was assigned to run the meetings, and the position of chairman rotated among members of the cartel approximately every six months.¹⁹⁶ Meetings had agendas, typically circulated among attendees beforehand “...so that participants can discuss with sound preparation about how we are going to do—to meet such market competition and how to shares—how to share the market.”¹⁹⁷ The “chairman” also assigned “jobs” to individual attendees to provide specific information that differed across attendees “so that the demand and supply market situations will be more accurately depicted.”¹⁹⁸ In other words, individual attendees of the glass

¹⁸⁸ CHU00028730E–3E, Exhibit 1106E.

¹⁸⁹ CHU00028730E–3E, Exhibit 1106E.

¹⁹⁰ CHU00028730E–3E, Exhibit 1106E. As described in more detail below, the use of “bottom” prices is an example of how the CRT cartel used pricing structures. In addition, the decision to “maintain” market shares is a classic example of an allocation structure.

¹⁹¹ C.C. Liu (Chunghwa) Deposition, pp 50, 52-3, 66-7; Jae In Lee (Samsung SDI) Deposition (2013), pp. 21-2; S J. Yang (Chunghwa) Deposition, pp. 60-1; Jing Song Lu (Chunghwa) pp. 37-8.

¹⁹² CHU00030679.01E–83E (Exhibit 1312E); CHU00030688E–91E (Exhibit 1303E), which also notes BMCC as a meeting attendee; CHU00030695.01E–7.02E (Exhibit 1301E).

¹⁹³ CHU00028755.01E–6.02E, Exhibit 1857E; CHU00028758E–9E.

¹⁹⁴ CHU00030414E – CHU00030418E, Exhibit 1267EF.

¹⁹⁵ CHU00030414E – CHU00030418E, Exhibit 1267EF.

¹⁹⁶ C.C. Liu (Chunghwa) Deposition, pp. 52-3, 74-6, 75-6, 55-7, 79-80, 350-1, 64-5, 64, 272-3, 272-4, 452-3; J.S. Lu (Chunghwa) Deposition, February 27-28, 2014, pp. 228-229; Jim Smith (Philips) Deposition, pp. 185-7.

¹⁹⁷ C.C. Liu (Chunghwa) Deposition, pp. 271-74.

¹⁹⁸ C.C. Liu (Chunghwa) Deposition, pp. 52-3.

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meetings would collect information on the CRT industry in order to bring more accurate information back to the glass meetings so that the decisions made to “for instance, raise the price” would be made with the most “confidence.”¹⁹⁹

- (63) The communication in support of the CRT cartel was not, however, limited to the discussions that took place at the glass meetings.
- First, the meeting chairman also “designated” or “assigned” “certain people to...communicate to other companies [that] were not at the glass meetings.”²⁰⁰ An as example, a meeting was held on May 18, 1998, between representatives of Chunghwa and “the executive section chief responsible for the CDT market at TSB [Toshiba] Japan's CRT headquarters.”²⁰¹ Toshiba’s representative “arranged a pricing opinion exchange especially for this Taiwan visit.”²⁰² According to the meeting minutes, Toshiba shared information on its CPT and CDT production and capacity levels, and the firms reviewed “bottom limit” prices discussed and “finalized” by Chunghwa, Philips, and Samsung SDI at “last Tuesday’s meeting.”²⁰³
 - Second, information was collected from non-attendees and presented at the glass meetings. Minutes from a working-level meeting on September 13, 1999, reflect detailed information on Toshiba’s future production and capacity data despite the fact that Toshiba did not attend the meeting.²⁰⁴ As another example, SDI, Orion, Philips, and Chunghwa met on April 23, 1997, to

¹⁹⁹ C.C. Liu (Chunghwa) Deposition, pp. 52-3. The full question and answer pair provides insight into the goals and purpose of the glass meetings:

Q. You indicated that in 1997 David Chang from Philips came up with a more structured group meeting. Could you please explain what you mean by “more structured group meeting”?

THE WITNESS: After 1995, almost all the CEOs of all the CRT manufacturers began to meet regularly. Regarding the price it was discussed regarding how much for a certain model and how to price that. However, whether a price can remain stable or not depends more on the demand and supply situations. David Chang came up with something more efficient because we believed that the market and the supply situations should be addressed with the emphasis in order to keep the price. In that case every one of us would have strong confidence to know the market situations and changes in demand and the supplies. If there is an over-supply then we will discuss, “What shall we do?” If there was a shortage then we can raise the price. If we could more accurately understand the market trends, we will have greater confidence in the situations, for instance to raise the price.

In order to fully obtain the information and the figures, we then had job divisions, unlike before people just chat on top of their head. The Chairman was thus elected to assign jobs that you should provide this information and the others should provide another information so that the demand and supply market situations will be more accurately depicted.

²⁰⁰ C.C. Liu (Chunghwa) Deposition, pp. 81-93.

²⁰¹ CHU00028252E-3E (Exhibit 1285EF); S.J. Yang (Chunghwa) Deposition, pp. 429-32.

²⁰² CHU00028252E-3E (Exhibit 1285EF); S.J. Yang (Chunghwa) Deposition, pp. 429-32.

²⁰³ CHU00028252E-3E (Exhibit 1285EF); S.J. Yang (Chunghwa) Deposition, pp. 429-32.

As another example, *see* SDCRT-0086419E-20E and CHU00028463-4E (Exhibit 1133E) documenting a group meeting on July 31, 1998, that reflected an agreement to increase prices August 1 “without exception” and a subsequent meeting between Chunghwa and Panasonic at which Chunghwa “explained that starting on August 1, price increase has effectively been implemented” and at which “Director Liu [of Chunghwa] also indicated to Matsushita its determination on controlling the price by volume; the entire industry would be jointly to control output volume in order to maintain pricing.”

²⁰⁴ CH00029065.01E-7E (Exhibit 1255EF); S.J. Yang (Chunghwa) Deposition, pp. 192-6. Yang’s testimony indicated that “information about Toshiba was mostly provided by Orion.”

discuss prices for 14" and 15" CDTs for May, exchange inventory and production data, and review the status of orders for themselves and other conspirators not in attendance (LG, HEDS [Hitachi], MEC [Panasonic]).²⁰⁵ The minutes indicate that Mr. Na of Samsung SDI “will persuade Hitachi to follow to USD110.00/pc.”²⁰⁶ Notes from a meeting between Chunghwa and Hitachi six days later (April 29, 1997) indicate that, “As for the matters concerning price hike, HTC said that price hike for 17" must go forward and it has already notified everyone. Even if orders decrease, it will implement this decision to the end. At the same time, it would also increase prices to customers other than Taiwan makers in order to maintain the competitiveness of Taiwan makers”²⁰⁷ (emphasis in original).

- Third, there were meetings and other communications between subsets of the conspirators, including Mitsubishi, to discuss pricing to individual customers, production levels, and other issues.²⁰⁸ For example, notes from a June 9, 2000, meeting between Toshiba and Chunghwa reflect Toshiba providing Chunghwa with detailed production and capacity figures, plans for future production, and Toshiba’s desire to “understand the situation of the July price increase” for 14", 15", and 17" CDTs, which Toshiba claimed it would “FLW” or “follow.”²⁰⁹ As a second example, Thomson, DOSA (a joint venture between Daewoo and Orion),²¹⁰ Samsung SDI, and LPD met in Rome in June 2002. The meeting notes reflect an “exchange of sales (medium) information for each company in 1Q–3Q [third quarter was a forecast],” detailed production information and capacity adjustments for LPD’s European plants for specific products (e.g., 28" CPT, 15" CDT).²¹¹ As a third example, SDI, MTPD, and LPD met to exchange information on prices, set bottom prices for the upcoming quarter and specific prices to “special clients,” and discuss future production plans.²¹²

This meeting also provides an example of how discussions from the glass meetings were communicated to other cartel participants. On the day after the working-level meeting, S. J. Yang and C. C. Liu of Chunghwa met with Mr. Matsumoto of Panasonic to update Panasonic on other CRT firms’ efforts to raise and maintain prices. Panasonic shared its capacity information for 20" and 21" CPTs and 17" CDTs. Chunghwa provided pricing information it had received the day prior at the meeting. *See* CHU00028441.01E-6E (Exhibit 1256E); S. J. Yang (Chunghwa) Deposition, pp. 198-201.

²⁰⁵ CHU00028740.01E–3E (Exhibit 1120E).

²⁰⁶ CHU00028740.01E–3E (Exhibit 1120E).

²⁰⁷ CHU00028393.01E-3.02E (Exhibit 1121E).

²⁰⁸ A detailed description of Mitsubishi’s communications and meetings with other Co-conspirators is included in Section VI below.

²⁰⁹ CHU00028209.01E-10E (Exhibit 1161E).

²¹⁰ *See* <http://www.telecompaper.com/news/dosa-to-make-colour-picture-tubes--89651>.

²¹¹ SDCRT-0087705E–7E.

²¹² MTPD-0423675–7E (Exhibit 1932EF).

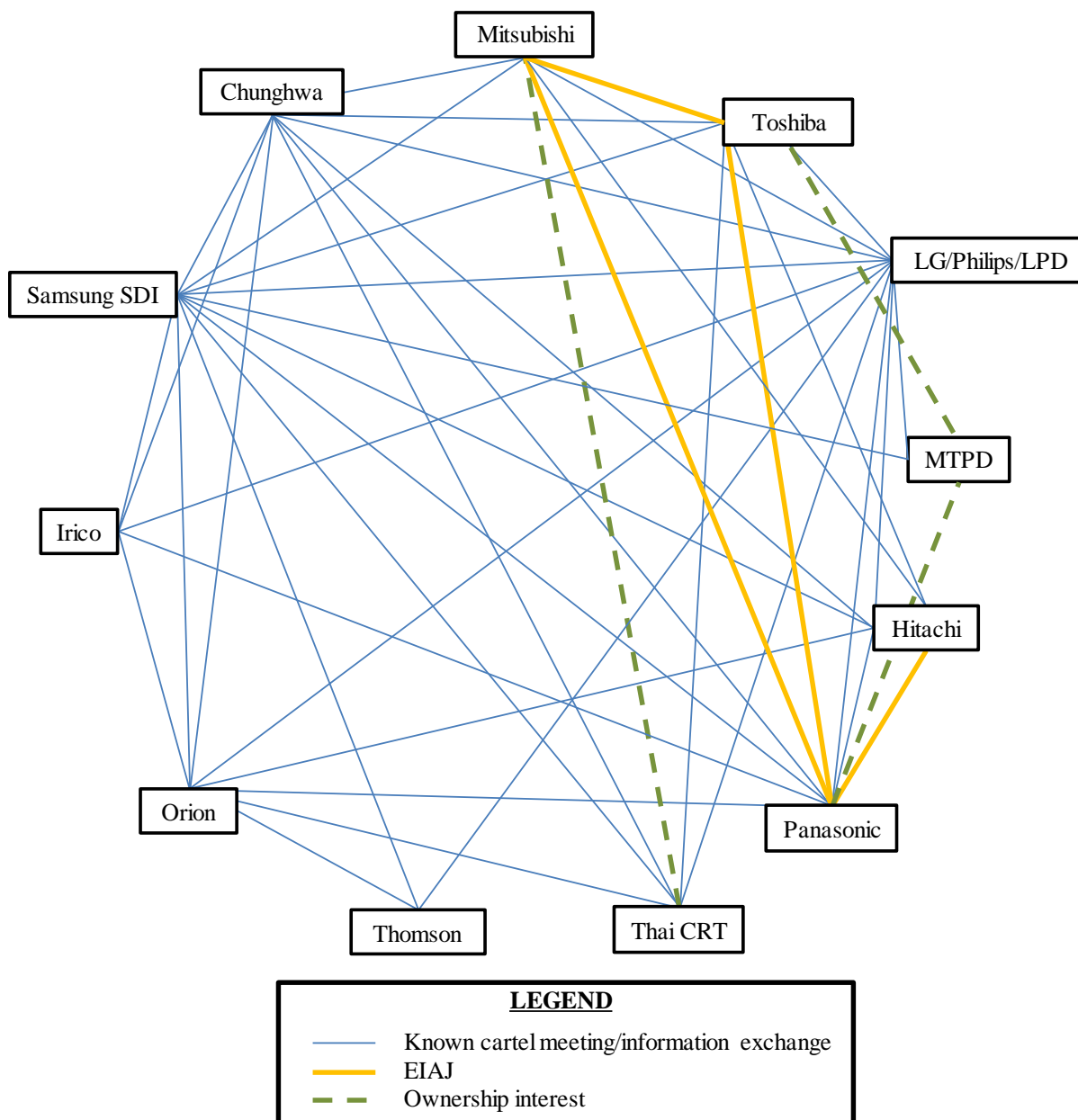
The meetings attended by Samsung SDI, MTPD, and LPD were referred to as the “SML” meetings, and these meetings provided another avenue for the cartel members to share competitively sensitive information. Yamamoto (Toshiba/MTPD) Deposition, p. 382; Nishimaru (Toshiba/MTPD) Deposition, pp. 107, 220-3.

Additional examples of meetings at which competitively sensitive information was exchanged include:

- (64) This wide spectrum of meetings and information exchanges reinforced the price, allocation, and monitoring/enforcement structures set up by the cartel members. Moreover, the conspirators took steps to conceal their meetings and made statements that indicate that they recognized their anti-competitive implications. This makes sense in light of the discussion of the DOJ/FTC Competitor Collaboration Guidelines discussed above because the communications between members of the CRT cartel were not the pro-competitive kind identified by the agencies. The cartel members were not sharing R&D and/or industry know-how to help themselves become more cost effective or innovative. The firms were sharing competitively sensitive business information that competing firms would have no incentive to share with each other absent ongoing collusion and that would be useful in supporting collusion.
- (65) The meetings and other information exchanges documented in the contemporaneous notes from these meetings described above (and in Section VI regarding Mitsubishi) reveal the web of interactions between the Co-conspirators in this case. The links between the Co-conspirators are illustrated in Figure 7 below.

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- MTPD-0483335-6: Samsung SDI, MTPD, and LPD met on September 13, 2004, to discuss prices and customers for large CRTs (25", 29", 32"). The firms agreed they wanted to begin focusing on pricing their products in a uniform manner.
 - SDCRT-0091715E-8E (Exhibit 648EF): In March 2006, Samsung SDI, LPD, and Chunghwa discussed CDT demand, and how it was affecting the market shares of each company. A table from the meeting shows the agreed-upon market shares for particular customers.
 - CHU00028589.01E-90.02E (Exhibit 1180E): On October 23, 2001, Samsung SDI, LPD, and Chunghwa discussed the dropping retail prices of CRT products. Samsung SDI "proposed a hotline and bimonthly meetings of six representatives from the three companies. President Lin said that it is too late to set up a hotline. Instead, *sales staff should be strongly demanded not to reduce prices*. Subsequently, Samsung further proposed changing to having the three companies meet monthly to verify prices for customers other than those of inter-group trading. The initial verification meeting was scheduled to be held in South Korea on 11/24." The meeting notes also reflect a discussion of specific customers: "SDI also called on the three makers to agree that *even if an order is lost, sales staff will not be instructed to cut prices to snatch back the order, to avoid being played off against each other by customers*. In the future, it is suggested that they should communicate and compare notes on dealings with BenQ, AOC, Compal and Delta" (emphasis added).
Two days later, Mr. Jae In Lee of Samsung SDI met with Mitsubishi to discuss "sales projections, pricing, price forecasts, production, [and] LPD's manufacturing operations." Mr. Lee admitted to having met with Mitsubishi multiple times between 1998 and 2005 to discuss the CRT industry. Jae In Lee (Samsung SDI) Deposition (2013), pp. 60-2.
 - CHU00028532E-3E: Mitsubishi met with Chunghwa in December 1998 to exchange information on the CDT market. Mitsubishi relayed that it had ceased production of 14" and 15" CDTs and produced only 17" and 21" CDTs in its Japan factories, and disclosed its production numbers for 1995-1997.
 - SDCRT-0090350E-3E (Exhibit 644EF); CHU00644987 (Exhibit 1680E); CHU00644988 (Exhibit 1681): On November 24, 2004, Jin Kang Jung (LPD) e-mailed Chunghwa and Samsung SDI the agreed upon relative market shares for the three companies. The market shares are identical to the shares agreed upon at the November 15 meeting. The Excel workbook included in the email exchange contains three different ways the companies could reach the agreed-upon market shares by dividing certain customers.
 - HDP-CRT00026227E-8E (Exhibit 1599EF): In January 2002, Toshiba sends Hitachi its 2001 "performance results" of its 32" and 36" CRTs.

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Figure 7: Known meetings and information exchanges between Co-conspirators²¹³

²¹³ The exchange of competitively sensitive information among Japanese manufacturers through the EIAJ, a Japanese trade association, and its implications are discussed in Section VI.B.4.

IV.C. The typical building blocks for effective collusion were present

- (66) As discussed in Section III, the typical building blocks for effective collusion include pricing, allocation, and monitoring/enforcement structures. As part of my academic research, and in my consulting work, I have studied a large number of prosecuted cartels.²¹⁴ Based on that experience, I have seen a variety of these structures put in place to support effective collusion. As described above, it is the nature of studying illegal agreements that in some cases the surviving evidence is spotty. As a result, for some cartels I have studied there are only hints at how certain structures operated, but for others there is a high level of detail.
- (67) In the matter at hand, the evidence supports the conclusion that the structures in place were sufficiently well developed to support effective collusion. In particular, the organized structure of communications, with various levels of contact, regular meetings, and formal agendas, is similar to that of cartels such as the vitamins,²¹⁵ LCDs,²¹⁶ gas-insulated switchgear,²¹⁷ graphite electrodes,²¹⁸ and specialty graphite cartels.²¹⁹ I review these and other cartels next, followed by a discussion of the specific conduct in this matter.
- (68) An emphasis on price increases (or limiting the rate of price declines) is typical of industrial cartels. For example, participants in the vitamins cartel coordinated price increase announcements, including

²¹⁴ Marshall and Marx, *Economics of Collusion*; William E. Kovacic, Robert C. Marshall, Leslie M. Marx, and Halbert L. White, “Plus Factors and Agreement in Antitrust Law,” *Michigan Law Review* 110, no. 3 (2011): 393–436; Robert C. Marshall, Leslie M. Marx, and Matthew E. Raiff, “Cartel Price Announcements: The Vitamins Industry,” *International Journal of Industrial Organization* 26 (2008): 762–802; Robert C. Marshall and Leslie M. Marx, “Bidder Collusion,” *Journal of Economic Theory* 133 (2007): 374–402.

²¹⁵ For Vitamins A and E, the cartel had a “complex structure” of “regular meetings” of which there were “four levels”: “Top level,” “Heads of marketing,” “Global product marketing,” and “Regional product marketing.” See EC decision in Vitamins at ¶¶ 172–88. According to Dennis W. Carlton and Jeffrey M. Perloff (2005), *Modern Industrial Organization, 4th edition*, at 142–143, “[a]lthough the exact amounts by which the cartel raised prices are subject to dispute, the increases during the cartel period were sizable. For example, the average price for vitamin A rose by 40 percent and that of vitamin E increased over 60 percent.”

²¹⁶ “...the so called ‘Crystal Meetings’ were multilateral meetings among Samsung, LPL, AUO, CMO, CPT, and Hannstar, held in Taiwan. Those meetings were [*] (i) high level multilateral Crystal meetings between high level management (occasionally referred to as Green Meetings) and (ii) working level commercial Crystal Meetings.” See EC decision in LCDs at ¶ 74.

²¹⁷ “The members (like Fuji) that were not in the respective committee took part in the annual general meeting foreseen in the GQ-Agreement for all parties, as well as in the preparatory meetings of each group in view of the ‘E/J joint committee meetings’, (‘working level meetings’ and often ‘management level meetings’) to be held every two weeks to ‘exchange claims and/or interests of projects’ and decide on the projects.” See EC decision in gas-insulated switchgear at ¶ 151.

²¹⁸ “Cartel meetings were held at several different levels: periodic ‘Top Guy’ meetings..., regular ‘Working Level meetings’..., group meetings of the ‘European’ producers without the Japanese..., national or regional meetings for particular markets, [and] bilateral contacts between competitors.” See EC decision in graphite electrodes at ¶ 47.

²¹⁹ “Successful implementation of the cartel agreements entailed the holding of regular multilateral meetings. There were 4 levels of meetings: ‘Top Level meetings,’ ‘International Working Level Meetings,’ ‘Regional’ (European) meetings, [and] ‘Local’ (national) meetings.” See EC Decision in specialty graphite at ¶ 102. ¶ 186 of the specialty graphite decision suggests that at least some of the communications with the “Japanese producers” were through “bilateral contacts” separate from the “International Working Level” meetings. This is similar to the pattern of communications with some of the Japanese producers of CRTs discussed herein.

the identity of which firm would go first in announcing a new price increase, the effective date of the price increases (often two weeks or more in the future), and the justifications that cartel members would offer to their buyers for the price increases.²²⁰ The use of line shut downs and slowdowns to achieve output restrictions is also typical. For example, the EC references notes from a meeting of the TFT-LCDs cartel in which “[t]he parties agreed to have an operation meeting on 13 November and a CEO meeting on 15 November with an agenda including 2002 supply-demand report, *factory shut down schedule* and 2002 price discussion”²²¹ (emphasis added).

- (69) The use of market share allocations, customer allocations, geographic allocations, and attentiveness to the requirements of individual cartel members is also typical. Market share allocations feature in numerous cartels and have been described in the literature as “probably the most efficient of all methods of combating secret price reductions.”²²² Customer allocations have the advantage of being relatively easy to monitor—if a cartel firm is supposed to supply a particular customer, then that firm will observe if it is not supplying that customer, alerting it that a rival supplier has taken the business.²²³ Another allocation structure component can be seen in the lysine cartel, where cartel members allocated sales in part using the members’ home countries.²²⁴
- (70) There have also been many cartels involving a number of different types or varieties of the general product whose price is being fixed. Some examples include the following:
- Vitamins (not only the different vitamins themselves, e.g., A, C, E, but individual grades or varieties of each product (e.g., E Oil USP, E 50% Adsorbate) and mixtures of products (e.g., vitamin premix for animal feed)

²²⁰ Leslie M. Marx, Robert C. Marshall, and Matthew E. Raiff. “Cartel Price Announcements: The Vitamins Industry.” *International Journal of Industrial Organization* 26, no. 3 (2008): 762–802.

²²¹ EC decision in LCD (http://ec.europa.eu/competition/antitrust/cases/dec_docs/39309/39309_3643_4.pdf) at ¶ 105.

As another example, the FTC reached a Consent Decree settlement with Stone Container Corporation in case involving an invitation to collude to restrict the supply of linerboard (“Stone developed a plan to take downtime at its plants, to reduce its production by approximately 187,000 tons at the same time it was purchasing 100,000 tons of linerboard inventory from competitors and to reduce its own inventory by 87,000 tons, the FTC alleged. This was the largest voluntary reduction in output in the history of the U.S. linerboard industry. To implement the plan, Stone contacted competing companies to determine which held unneeded inventory and then purchased excess inventory from several, the agency said. In both private conversations and public statements the executives of Stone Container signaled their intention to take mill downtime and reduce industry-wide inventories and their belief that doing so would build support for a price increase. According to the FTC complaint, the actions and statements constituted an invitation by Stone to its competitors to join a coordinated price increase. If accepted, the invitation would result in higher prices, reduced output and consumer injury, the complaint alleges.”) See <https://www.ftc.gov/es/node/78670>.

OPEC also attempts to reach agreements to restrict production to boost prices. See, e.g., <http://www.bbc.com/news/business-30131386> (“The big question is whether they will decide to cut their production ceiling in an effort to boost prices.”)

²²² Stigler (1964) at 1469. Examples of cartels that have implemented market share allocations include carbonless paper (see EC decision at ¶ 81), rubber chemicals (see EC decision at ¶ 66-67), and vitamins (see EC decision at ¶¶ 189-199).

²²³ Examples of cartels that have implemented customer allocations include food flavour enhancers (see EC decision at ¶¶ 65 and 68) and methylglucamine (see EC decision at ¶ 46).

²²⁴ See EC Decision at ¶¶ 57 and 211 (“Furthermore, at least in 1991, Ajinomoto, Kyowa and Sewon agreed to the home-market principle, i.e. that the local producer should sell as much as possible in its own region.”)

- DRAM (multiple types (e.g., SDRAM, DDR), densities (e.g., 64 MB, 128MB), and speeds, among other product characteristics, all of which were rapidly evolving)
- TFT-LCDs (combinations of size, aspect ratio, application (TV, monitor, notebook computer), refresh rate, among others)
- Carbon brushes (customized products for individual customer applications).

While it may require additional coordination among cartel members to fix prices in an industry with a larger number of products, the cartels listed above (among others) suggest that it is possible and not necessarily uncommon to fix prices in these industries.

IV.C.1. Cartel actions on price and quantity

- (71) The CRT Co-conspirators used multiple types of pricing structures to achieve their stated goals to “maintain and raise” prices and avoid “vicious competition” among themselves.²²⁵ Chunghwa’s notes on a November 1996 meeting with Hitachi and Samsung SDI state, “[I]t can be understood that one might reduce their price in order to sell, however if the price drops too low, it will not help to increase sales, but instead cause each maker to keep cutting the price and bleed.”²²⁶ The situation that Chunghwa describes is the situation that cartels seek to avoid. For the industry to “continue slashing price in bleeding competition is not good for CRT factories...”,²²⁷ in other words, for the Co-conspirators.
- (72) The minutes and notes from CRT cartel meetings, as well as from bilateral and multilateral communications, provide insight into the pricing structures the Co-conspirators used to implement the cartel. I found evidence of the following pricing structures used by the CRT cartel:
- Coordination on CRT prices, including general price increases, targeted price increases, price “floors” (or “bottom” prices), and setting price differentials between different CRT types
 - Restricting production quantity and coordinating future production and/or capacity levels.

²²⁵ S.J. Yang (Chunghwa) Deposition, pp. 333-4. C.C. Liu (Chunghwa) Deposition, pp. 345-46.

Mitsubishi was important to the success of the price “maintenance” according to the Co-conspirators. For example:

- At a meeting between Samsung SDI and Mitsubishi, SDI notes that “Maintenance of the 21” price depends on the prices for 19” LCDs and Mitsubishi CRTs”. See ME00131622E.
- In a March 2003 meeting, SDI and Mitsubishi discussed “CDT price maintenance”. See SDCRT-0006041E-2E (Exhibit 635EF).

²²⁶ CHU00028396.01E-7E, Exhibit 1104E. The meeting notes continue to say that they “[h]ope that [Hitachi] can keep in contact and negotiate with each CRT factory to prevent the price of CDT from collapsing,” followed by a discussion of the “bottom price” for 14” CDTs they hope to maintain and a discussion of “the price differential between ITC and B+D” tubes.

²²⁷ CHU00028786.01E-8E, Exhibit 1293E.

- (73) As described in more detail below, the Co-conspirators shared and discussed sensitive information that would not be in their unilateral self-interest to share. As discussed in Section III.D, competing firms have an incentive not to share prices or other competitively sensitive information. For example, price information would inform the competitor about the price it should meet or beat to gain that customer. Sharing this competitively sensitive information is, however, an important aspect of operating a cartel.
- (74) The record in this case is replete with examples of the structures used by the cartel. There are meeting minutes or notes from meetings showing that the Co-conspirators, including Mitsubishi, discussed and coordinated on prices. Likewise, there are examples of market share and customer allocations in addition to examples of the Co-conspirators monitoring one another and enforcing their agreements. The examples discussed in more detail below are not somehow “unique” or “atypical” of the record more broadly. Rather, they are illustrative of the Co-conspirators’ actions and how those actions are consistent with collusive behavior and inconsistent with the individual firms’ unilateral self-interest. The remainder of this section describes these cartel structures in more detail.

IV.C.1.a. Coordination on CRTs prices

- (75) Meeting notes produced by Chunghwa from a September 26, 1998, meeting between Chunghwa, Samsung, LG, Orion, and Thai CRT illustrate the detail at which the Co-conspirators discussed pricing.²²⁸ The meeting notes contain tables listing the price each Co-conspirator would be charging specific customers in the (upcoming) fourth quarter of 1998 for 14", 20", and 21" CRTs.²²⁹ The pricing table for 14" CRTs is replicated below.

²²⁸ CHU00029262E–4.02E (Exhibit 1300E).

²²⁹ CHU00029262E–4.02E (Exhibit 1300E). The table shows prices quoted on different terms. In response, “LG/Orion personnel stated that due to makers’ quotation method is different, FOB/CIF/Arrival etc., to accurately compare each maker’s actual price, identical quotation method and payment conditions should be used to recalibrated comparison. After a long discussion on freights, customs charges and insurance costs etc., the recalibrated prices based on each customer by respective makers are as per Attachment (1).”

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Figure 8: Pricing table from CHU00029262E²³⁰

(A) Q4 selling prices of respective makers:

98 4th QTR () MEANS 98 3Q PRICE)

SIZE	CTV MAKER	CPT	U/PRICE	CONDITION	TERM	PRICE (US\$)	
						FIX/OFFER	FINIAL
14"	AIWA (PH/MAL) (THAI)	SDD	33.50(I)	CIF	L/C AT SIGHT	NOT YET	REQUEST PRICE LEADER'S ONE
		LGE	32.36(I)	FOB	L/C AT SIGHT	FIXED	
		CPT	33.00(I)	CIF	L/C AT SIGHT	FIXED	
		THAI CRT TEDI	32.00(I)	ARRIVAL	45 DAYS	FIXED	
	SREC	SDD	30.00(B)	ARRIVAL	30 DAYS	OFFERED	PRICE DOWN REQUESTED
		LGE	29.80(B)	CIF	30 DAYS	NOT YET	
		CPT	30.00(B)	ARRIVAL	30 DAYS	OFFERED	
		OEC				NOT YET	
	STTM (THAI)	TEDI	30.00(B)	CIF	L/C AT SIGHT	NOT YET	FOLLOW DOWN PRICE
		THAI-C	32.00(B)	ARRIVAL	45 DAYS	NOT YET	
		SDD	32.00(B)	CNF	L/C AT SIGHT	NOT YET	
		LGE	32.13(B)	CNF	L/C AT SIGHT	NOT YET	
	FUNAI (MAL)	SDD	31.00(B)	ARRIVAL	30 DAYS	NOT YET	
		CPT	35.50(I)	ARRIVAL	30 DAYS	NOT YET	
		LGE	31.00(B)	CIF	L/C AT SIGHT	NOT YET	
		OEC	30.50(B)	CIF	L/C AT SIGHT	OFFERED	
	ORION (THAI)	TEDI	30.50(B)	CIF	L/C AT SIGHT	OFFERED	
		CPT	31.00(I)	ARRIVAL	L/C AT SIGHT	FIXED	[Handwritten: "30 30 30"]
		THAI	31.00(I)	ARRIVAL	45 DAYS	FIXED	
		TEDI				NOT YET	
	TCE (THAI)	SDD	30.00(B)	FOB	L/C 30D	NOT YET	REQUESTED \$31.00
		CPT	32.50(I)	EX FACT	30 DAYS	FIXED	
		LGE	33.00(I)	FOB	30 DAYS	NOT YET	
		THAI-C	32.00(I)	ARRIVAL	ARI 45D	FIXED	
14"	JVC (THAI)	OEC	30.50(B)	CIF	L/C AT SIGHT	OFFERED	
		CPT	31.00(B)	CIF	L/C AT SIGHT	NOT YET	
		THAI-C	31.00(B)	ARRIVAL	45 DAYS	NOT YET	
	SANYO	OEC	30.00(B)	FOB	L/C AT SIGHT	FIXED	
		SDD	29.50(B)	FOB	L/C AT SIGHT	FIXED	
		LGE	29.50(B)	FOB	L/C AT SIGHT	FIXED	

- (76) The meeting notes state that a “common understanding was reached” to “keep the minimum price” and “try to keep the current price.” The minutes also reflect a conversation about one specific customer. Samsung SDI “stated the selling price of Thai-CRT and Chunghwa Picture Tube’s 14” to WET in Thailand is on the lower side comparing to market price and requested Thai-CRT and Chunghwa Picture Tube to try their best to raise 14” price.” Chunghwa was “willing to work on it again” if “SDD/LG/Orion would promise not to Approach.” According to the meeting notes, “SDD/LG/Orion all guaranteed not to Approach and asked that Thai-CRT and Chunghwa Picture Tube must try their best again.”²³¹ These statements highlight the goals of this cartel and of price-fixing cartels more broadly—the Co-conspirators would be able to raise and/or maintain prices as long as they did not have to compete with one another for business and limited the ability of customers to play the cartel members off against one another. These tables also serve as an example of the type of information firms in a competitive market would not be willing to share with one another absent a cartel. Sharing this level of pricing data with a competitor would create a “road map”

²³⁰ The “CTV MAKER” in the second column is the customer at issue.

²³¹ CHU00029262E-4.02E To do so, the notes state that Chunghwa requested “...that in order to further guard the pricing, each maker ought to maintain its current market share.” As described in more detail in Section IV.C.2, this is an example of the CRT cartel using an allocation structure.

that would show firms the prices to charge in order to steal business from one another and is not in a firm's unilateral self-interest.²³²

- (77) The CRT Co-conspirators also discussed raising prices more broadly, that is, not just prices for specific customers.²³³ Notes from a January 18, 1999, meeting indicate that the attendees discussed “the issue of raising prices for 17” CDT on January 16 [i.e., two days earlier].”²³⁴ Their “conclusion” was that “the 17” CDT price increase [was] proceeding smoothly: each maker has increased prices since January 16th” (emphasis in original). Samsung, LG, Orion, and Chunghwa each commented on the price increase:
- Samsung noted that its “customers have all accepted the price increase of 17”...thanks to the continuous strong demands, this time it has already been successfully accomplished.”
 - LG noted that “the price increase of 17” has also been achieved smoothly.”
 - Orion noted that “customers also did not reject the price increases.”
 - Chunghwa noted that “two customers had asked us to follow up the request of implementing the price increase in February, claiming that other suppliers have accepted postponing the price increase until February. But we ignored them.”²³⁵
- (78) Chunghwa's comment highlights one of the reasons a cartel can be effective at elevating prices. In a competitive environment, a customer seeks to and may be able to pit potential suppliers against one another to gain lower prices or better contract terms. However, when that customers' suppliers have formed a cartel, attempts to play the suppliers against one another will be less effective. By virtue of its meetings and information exchange with its Co-conspirators, Chunghwa was able to “ignore” its customers' requests to postpone price increases.²³⁶

²³² There are many other examples where meeting notes suggest that CRT cartel members discussed specific “target” prices for individual customers. *See, e.g.*, CHU00029105.01E–7.02E (Exhibit 1166E), CHU00029131.01E–7E at 6.01E (Exhibit 710EF), MTPD-0479714E.5E (Exhibit 1411E), SDCRT-0088635–74, TSB-CRT-00039414E (Exhibit 1791E), TSB-CRT-00039415E (Exhibit 1792E), CHU00036408E and CHU00029971E.

Mitsubishi also shared its product-specific prices with its Co-conspirators. For example, Mitsubishi provided its “current 17” x 0.28mm selling price and market price (USD250 – 270)” and for 17” x 0.25mm CRTs (“can reach USD320 – 30/pc”) to Ching-Yuan Du of Chunghwa, who is known to have attended the glass meetings. *See* CHU00028558E (Exhibit 1111E).

As another example of coordination on specific customers, Samsung SDI met with Mitsubishi in March 2003 to “[t]o get SDI's opinion prior to price negotiations with Samsung Electronics.” *See* SDCRT-0006041E-2E (Exhibit 635EF).

²³³ Notes from a meeting between Mitsubishi and Samsung in March 2004 indicate that they discussed price increases on 17” and 19” CRTs. The meeting notes reflect that the price increase announcements that 17” and 19” “will be increased by \$2-\$3” and that the price increase announcements to customers “were completed.” *See* ME00131622E.

²³⁴ CHU00030701.01E–4.02E (Exhibit 1137EF).

²³⁵ CHU00030701.01E–4.02E (Exhibit 1137EF).

²³⁶ Two of the Chunghwa attendees of this meeting (C.C. Liu and S.J. Yang) met with Toshiba four days later (January 22, 1999). Notes from the meeting indicate that “CPT [Chunghwa] explained China and Korea's determination to increase \$5-7 [for 17” CPTs] on 1/16. TSB can definitely insist on the increase.” Toshiba had been seeking increases of as much

- (79) Collusive price increases can be reinforced by one firm leading the price increase announcement and the other firms matching with identical announcements soon after.²³⁷ The use of joint announcements combats potential buyer resistance. If a single firm were to inform a customer of an increase, that customer may be unsure if it is being singled out or if it is facing an industry-wide price increase.²³⁸ If a customer observes that multiple firms in an industry are increasing price, that customer may be less likely to try to negotiate aggressively because it observes multiple firms in an industry following the price increase.²³⁹ In addition, that customer may be less likely to try to negotiate aggressively because it has reduced concern that it will be disadvantaged relative to its own rivals by relatively higher input costs.²⁴⁰
- (80) Notes from a March 2000 cartel meeting reflect both general price increases by CRT size and customer-specific price increases.²⁴¹ In addition, the notes reflect a specific “increase plan” where LG, Orion, and Chunghwa agreed to increase prices for 14", 20", and 21" CRTs on various “Effective Day[s]”:

Figure 9: Pricing table from CHU00029147E*(B) Price Issues:*

According to the aforementioned supply/demand and glass price-increase status, the makers at the meeting proposed the following increase plan:

Maker	LG	SDI	OEC	Thai-CRT	CPT	PH
14"	\$1 \$2		\$1 \$1		\$2 \$2	
20"/21"	\$1 \$1		\$1 \$1		\$1 \$1	
Effective Day	14" - 5/1 20" - 7/1	14" - 4/1 20" - 4/1	14" - 4/1 20" - 4/1	14" - 4/1 20" - 7/1	14" - 5/1 20" - 5/1	14" - 4/1 20" - 4/1

- (81) Regarding the timing of the increase, the notes state that although “the decision to communicate to customers that April 1 would be the effective date of the price increase” for 14" CRTs, “considering the lead time and customer acceptance rate, the actually effective date should be May 1.” By allowing one to two months of lead time, as the meeting minutes note, the cartel would have been able to assess buyers’ acceptance of the price increases and could potentially retract or revise them if they were heavily resisted by the buyers.²⁴²

as \$10. While Toshiba may not have attended the original January 18 meeting, it was made aware of the discussions through a bilateral communication with Chunghwa. *See* CHU00028240.01E-40.02.

²³⁷ Leslie M. Marx, Robert C. Marshall, and Matthew E. Raiff, “Cartel Price Announcements: The Vitamins Industry,” *International Journal of Industrial Organization* 26, no. 3 (2008): 762–802.

²³⁸ Leslie M. Marx, Vikram Kumar, Robert C. Marshall, and Lily Samkharadze, “Buyer Resistance for Cartel versus Merger,” *International Journal of Industrial Organization* 39 (2015): 71–80.

²³⁹ *See* Marshall and Marx, *Economics of Collusion*, p. 221.

²⁴⁰ *See* Marshall and Marx, *Economics of Collusion*, p. 113.

²⁴¹ CHU00029147E–50.02E.

²⁴² *See* Marshall and Marx, *Economics of Collusion*, p. 222. *See also* Leslie M. Marx, Robert C. Marshall, and Matthew E. Raiff, “Cartel Price Announcements: The Vitamins Industry,” *International Journal of Industrial Organization* 26, no. 3

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- (82) The meeting notes also reflect that the “attendees decided on the price increases below after extensive discussion,” including (a) increases for 14" and 20" CRTs sold to specific customers and (b) specifying pricing differentials for ITC and Bare tubes (using a “conversion” given as “ITC = Bare+\$3.5” for 14" and “ITC = Bare+\$4.5” for 20" CRTs). In addition to specifying the new prices and the effective date of the price increase, the notes also reflect a discussion of which Co-conspirator should be “the leader” for each price increase:
- “According to LG’s suggestion the leader for this price increase have been changed to SDI → SREC, Thai-CRT→TCE, LG→AIWA, OEC→Funai, and CPT→Orion.”
 - “Each leader must provide written notification of its customer by 3/15” and the “Other member must follow by 3/20. Each maker shall report its status at the 3/24 working level meeting.”²⁴³
- (83) Another pricing structure used by the CRT cartel was the use of “bottom” or “floor” prices, about which S.J. Yang of Chunghwa testified:

Q. Sir, I’d like to direct your attention to the next page 28693. Do you have personal knowledge as to what the term “bottom price” means?

A. Bottom price, in our understanding that means the lowest price.

Q. And do you know what the purpose of discussing bottom price is at this meeting?

A. We ask for each other for this bottom price, the customer request us to low down [reduce] the price as low as possible, but we ask each other don’t low down the price, so we call that bottom price for lowest price.²⁴⁴

- (84) One of the benefits to the cartel of using “bottom” prices is that it allowed the Co-conspirators to set prices for their customers with substantial assurance that they would not be undercut by another Co-conspirator. The use of “bottom” pricing also builds in a *de facto* monitoring structure because it allows to Co-conspirators to identify instances of potential cheating. There are many examples in the record where notes from cartel meetings reference the use of bottom pricing, including:
- “...Therefore, it is a must to let the customers understand the bottom line of CDT pricing, and everyone shall persist in guarding the bottom line under a common understanding among the CDT industry, reduce work days temporarily to respond to the customers’ price coercion. Under everyone’s persistence by not giving in on the bottom line, the true Demand will gradually

(2008): 762–802.

²⁴³ CHU00029147E–50.02E.

²⁴⁴ S.J. Yang (Chunghwa) Deposition, p. 97-98.

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appear, orders will eventually increase for all and prices will then have a chance to stop dropping to create a win/win opportunity for the CDT industry.”²⁴⁵

- “Working level [meeting] suggested adjusting the 17" tube base price down by \$1 to \$89. But after discussing among the meeting participants, they agreed with President Lin’s idea to keep the \$90 bottom price. Beginning from March, because of the increase in glass prices, the price to major customers will be increased by \$1 to \$90.”²⁴⁶
- “The makers agreed to use 14": \$26.5 and, 20": \$44 as the lowest quoting basis for Q3.”²⁴⁷

- (85) The CRT cartel also set price differentials between CRT tubes. Price differentials were set on a number of dimensions including but not limited to ITC versus bare tubes, dot pitch size, horizontal scanning frequency, size, key accounts, and safety standards. As C.C. Liu testified:

Q. Let’s assume for a moment that you were to raise the price of 15-inch color picture tubes, without changing the price of the 17-inch color picture tubes. Do you have an understanding, based upon your years of experience in the CRT business, what effect, if any, that would have on the relative mix of sales of 15-inch and 17-inch CPT tubes?

THE WITNESS: This question is not difficult. We are professionals in this industry. We are selling tubes like professionals if not experts. How could we only change the price of a 15 inches tubes without changing the prices for 17 inches of tubes? Of course, we would consider the overall market structure and the market acceptance and the reasonable cost gaps. We would certainly raise the prices at the same time.²⁴⁸

- (86) At a June 2, 2000, meeting with Chunghwa, Samsung SDI, Orion, and Philips, the Co-conspirators appear to have set price differentials on a number of levels. After setting out a new “Price Guide Line” effective July 1, 2000, the meeting notes indicate that the Co-conspirators allowed for a \$1 price differential for 15" and 17" CRTs sold to “Key Account[s].”²⁴⁹ The meeting notes also indicate that the firms “decided” that “the 19" price still needs to remain at the former Agreed Prices,” with

²⁴⁵ CHU00028768.01E–70.01E (Exhibit 1229E).

²⁴⁶ CHU00030960.01E–62E (Exhibit 1158EF). The notes from this meeting also reflect discussions of cartel activity directed at Apple (“In addition, Mr. Choi from LG claimed that for Apple’s 15" model, the price of its tube is \$66.55. Currently Apple is looking for other monitor source. He asks everyone to support LG and not to quote a tube price below \$67 for this project.”). The notes also state, “All makers agreed to continue reduced production of 15"/17" in February,” with specific details for production shutdowns by company.

²⁴⁷ CHU00036414.01E–5E (Exhibit 1174E).

Other examples of the cartels use of “bottom” pricing are discussed in paragraphs (60)–(63) of my report. *See also* CHU00029262E–4.02E, CHU00030809.01E–14E, CHU00030831.01E–4E.

²⁴⁸ C.C. Liu (Chunghwa) Deposition pp. 296-97.

²⁴⁹ CHU00031006: The price of 15" and 17" MPRII tubes was set at \$67 and \$88, respectively, Key accounts would be \$66 and \$87.

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price differentials based on the frequency (85 Khz vs. 96 Khz), dot pitch size (0.25mm vs. 0.27mm), and safety standards (TCO vs. MPRII):²⁵⁰

Base Price: \$126, 0.27 / MPRII / 85 Khz
\$2 Gap for 85 Khz vs. 95 Khz
-\$2 Gap for 0.25mm vs. 0.27mm
-\$3 Gap for TCO vs. MPRII

- (87) Additionally, the meeting notes state that CPT “Director Liu indicated that they’re afraid that a decrease in the price differential between 14" and 15" will cause a 14" demand shift.”²⁵¹ This highlights why the CRT cartel coordinated on price differentials. The Co-conspirators appear to have been trying to preempt choices by their customers—price differentials “help put an end to customers’ picking and choosing to their own benefits.”²⁵² In addition, Chunghwa meeting notes from an “Abroad Trip” in March 2004 indicate the Co-conspirators discussed an “...opportunity to reinforce price differentials between big and small customers for the purpose of stabilizing market shares.”²⁵³ By using and setting price differences based on specific product characteristics, the Co-conspirators facilitated the implementation of the pricing actions taken at their meetings and sought to maintain stability and minimize cheating.

IV.C.1.b. Coordination on CRT production and capacity

- (88) Agreements to restrict supply are another pricing structure that cartels use, and the evidence in this case is consistent with agreements between the CRT Co-conspirators to restrict supply. In particular, the record has numerous examples of meetings at which the Co-conspirators exchanged competitively sensitive information on production levels and future production plans in addition to discussing specific numbers of days that the Co-conspirators would shut down production in the future. These actions regarding production and restricting quantity were instrumental to the cartel’s goals regarding price. As C.C. Liu of Chunghwa testified:

Q. Why did you reach an agreement on pricing and to reduce production and slow down or postpone line expansion, sir?

²⁵⁰ CHU00031006.

Chunghwa also appears to have discussed price differentials with Mitsubishi. For example, in a December 1998 meeting between Chunghwa and Mitsubishi, Mitsubishi reported that “[t]he selling price of the 17” ND tube is currently about USD 120-121/pc. Flat Tubes +5%”. See CHU00028532E-3E.

²⁵¹ CHU00031006.

²⁵² CHU00030787 (Exhibit 1147E).

²⁵³ CHU00031240E.

Other examples where the Co-conspirators appear to have discussed pricing differentials include SDCRT-0007585-87 (Exhibit 675EF) (based on tube size); CHU00029138E-43E (“the price difference between the 14" tube and 20"/21" tubes needs to be considered”); CHU00031174E-75E (screen coating and refresh rate); SDCRT-0086557-60 (regular vs. “short” tubes).

THE WITNESS: We had a price agreement. However, the base to achieve the agreement was fewer production. If there is over-production for customers, how would customers agree with your price increase?²⁵⁴

- (89) Exchanging information about current and future production and capacity is not in the unilateral self-interest of competing firms. Revealing information about future shutdown plans potentially enables rivals of the firm revealing the information to take business or make inroads with customers to take advantage of the firm's future shutdowns. For example, rivals may use the information to convince customers to switch away from the firm planning the shutdown before the shutdown actually occurs. Similarly, a firm's production mix (both current and future) is proprietary and strategic as it reveals what products a firm intends to sell, the focus of its sales efforts, and its ability to compete in the market. Absent a cartel, revealing that information to a rival (e.g., plans to alter its product mix) makes the firm revealing this information more vulnerable to competition. Doing so can be pro-collusive because it may allow rivals working together to allocate products among themselves to match consumer demand at potentially elevated prices, although markets would typically rely on the competitive process.
- (90) The most straightforward way in which the CRT cartel restricted production was in shutting production lines and/or factories to reduce days of production. As an example, notes from a February 1997 meeting state that one of the "conclusions" reached by Samsung SDI, LG, Philips, and Chunghwa was "[r]espective makers to reduce production days in order to control output quantity."²⁵⁵ Attached to the meeting minutes is a table listing capacity and production data by cartel member through June 1997 (i.e., four months into the future).²⁵⁶ The "production control table" was provided by Samsung SDI ("SDD provided production control table for all makers is hereby copied, revised and attached as an appendix"). Similarly, minutes from a "CDT Industry Meeting" in March 1999 contain several statements about reducing production:
- "To reduce the production of 17" monitors in April of '99 (25-day operation)
 →If necessary, reduce by 10% entirely in the 2nd quarter and then check monthly.
 →Submit production reduction plans (25-day operation plan) by next week and adjust/check the production by forming a separate monitoring team."²⁵⁷
 - Discussions and possibly modifications to planned capacity expansions in 1999.

²⁵⁴ C.C. Liu (Chunghwa) Deposition pp. 357-58.

²⁵⁵ CHU00028760E-2E. The meeting notes also state that a "conclusion was reached among the attendees on topics regarding how to let the customers believe that the current CDT price has hit bottom, and to be able to bounce back the price in order to maintain a healthy industry operating with profitability."

²⁵⁶ CDT producers listed in the table include Samsung SDI, LG, Orion, Hitachi, Toshiba, Panasonic, Mitsubishi, Chunghwa (CPT), and Philips (PH).

²⁵⁷ After noting an "agreement" to reduce production in April 1999 of 17" monitors, the notes suggest an "agreement" to "increase the price by at least \$5 starting in May of 1999."

- “In order to at least maintain the current price level or increase the price level, it is necessary to reduce production by at least 10% when taking the margin of 10% into consideration.”²⁵⁸

As another example, notes from an April 1999 meeting, for which the topic was “Exchange of CDT market information and review of production quantity of 17" CDT,” contain detailed “plans of reducing production for 17" in May as proposed by various makers”:²⁵⁹

Figure 10: Extract of CHU00030749E - CH000030751E (at 750.01E)

Company-	Factory	Line	OFF Day
CPT	Taoyuan	2	5/1, 5/2, 5/7, 5/8, 5/9
	Yangmei	2	5/1, 5/2, 5/21, 5/22, 5/23
	Malaysia	2	5/15, 5/16, 5/29, 5/30, 5/31
SDD	Suwon	2	5/2, 5/16(#3), 5/22, 5/23, 5/24, 5/25(#5)
	Pusan	2	5/1 5/2, 5/16, 5/23, 5/30
LG	Kumi	3	5/5, 5/16, 5/22, 5/23, 5/30
	Changwon	1	5/5, 5/16, 5/22, 5/23, 5/30
	Wales	1	5/8, 5/9, 5/29, 5/30, 5/31
Orion	Kumi	1	5/1, 5/2, 5/9, 5/16, 5/30
PH	Chupei	1	5/1, 5/5, 5/28, 5/29, 5/30
	Dapon	3	5/6(#5), 5/11(#4), 5/13(#3), 5/24(#3), 5/25(#3,#5) 5/27(#4), 5/29(#3,#4), 5/30, 5/31
	Lebring	1	5/1, 5/22, 5/23, 5/24, 5/27

²⁵⁸ SDCRT-0086563E-6E. The meeting notes also set out the dates of the next “management” meeting (April 14, 1998, to be held by Orion) and state that the “date of the next top meeting will be decided at the next management meeting.”

Other examples include:

- SDCRT-0086751E-3E (Exhibit 1901E): Philips would take seven “days off” for 15" and 17" CRTs, LG four days, Orion seven days, and Chunghwa six days. *See also* Jae In Lee (Samsung SDI) Deposition (2013) at 231-32. This document also appears to reflect information that Samsung SDI had that Mitsubishi had considered expanding a production line “but gave up.”
- CHU00030809.01E-14E (Exhibit 1148E): “Senior Manager Cheng proposed that the production stoppage period for 17" tubes be at least seven days in August in order to effectively ensure price levels. SDD and LG all claim that that arrangement for 7 day stoppage for August is basically OK; but hope to be able to maintain the original agreement of 5 days in July and 7 days in August for a total of twelve days. Ultimately, a resolution was reached by everyone that a minimum of seven days stoppage will be implemented in August. In addition, as for LG’s combined line of 15" and 17", meeting attendees all expressed objections that as production days of 15" can be converted as 17" stoppage days, LG was asked to review and make improvement. Meeting attendees resolved that each company shall report its production stoppage and Audit plans on the weekly meeting to be held on 7/28.”
- CHU00029262E-4.02E: September 26, 1998, meeting where the firms discussed that “in order to stabilize price for this over-supplied market, a simulated adjustment of each maker’s Q4 production volume plan is as follows:” The document then contains formulas for reducing output.
- SDCRT-0090346: October 2004 meeting where Samsung SDI, LPD, and Chunghwa “agreed to reduce the supplying quantities of each company,” and further “agreed to reduce CAPA [capacity] by total 20% among [the] three companies.”

²⁵⁹ CHU00030749.01E-51E (Exhibit 1143E).

- (91) In addition to specific discussions about production shutdowns, notes from meetings between Co-conspirators report discussions of information on future production plans as well.²⁶⁰ For example, LG provided Chunghwa with the production status of several of its plants, and the notes from the meeting reflect that LG shared its “plan for changes in production” for CPT and CDT products.²⁶¹ As another example, Samsung and Hitachi exchanged information on Samsung’s current and future production by plant and production line. The first line of the email, produced by Hitachi, ends with the parenthetical “handle with care/destroy after reading.”²⁶² Similarly, Samsung SDI, Orion, and Chunghwa exchanged information on production capacities and expansion plans. Notes from the meeting, produced by Chunghwa, specifically state that Chunghwa provided an “introduction to CPT present production capacity and plan for expanding lines in the future” and also indicate that Samsung SDI and Orion provided detail on their current and future production plans.²⁶³ The notes also suggest the parties “expressed agreement” to postpone their expansion plans:

All three makers have the common understanding that the supply-more-than-demand situation of CDT is serious, and CPT’s Chairman Lin suggested to everyone to reduce production and temporarily slow down or postpone line expansion plans to ride out the difficult period of 1997. Both SDD and ORION expressed agreement.²⁶⁴

- (92) The evidence cited above provides insight into how the Co-conspirators coordinated capacity and production decisions and how they viewed the relationship between the price increases they sought and quantity restrictions. Notes from a meeting attended by Samsung SDI, LG, Orion, Chunghwa, and Thai CRT offer a capstone of the CRT cartel’s actions related to production. Following a detailed “review on production capacity of each maker [in attendance]” by CRT size (14", 20", 21"), production line and location, the minutes reveal a discussion of sales by CRT size, with attached “details for each maker’s production line configuration and the planned production quantity.”²⁶⁵ The meeting notes contain the following statement:

²⁶⁰ As described in Section VI.B.2 below, Mitsubishi exchanged similar information on capacity and future production plans with its CRTs Co-conspirators. For example, in December 1995, Mitsubishi disclosed detailed information to Chunghwa on its future production and capacity: “Ceased production of 14"/15" CDT and is only producing 17"/21" in Japan” and detailed production plans for 17" 0.25mm and 0.28mm CRTs from March 1996 through the 3rd quarter. *See* CHU00028558E (Exhibit 1111E).

Mitsubishi also appears to have shared its current and future production information. For example, Chunghwa’s notes from a March 6, 2000, meeting with Mitsubishi reflect that Mitsubishi provided detailed production plans by plant and year to Chunghwa for 1999 (historical levels), 2000, and 2001. The notes also reflect Mitsubishi sharing its pricing data for 17" CPTs with a note that “[h]opefully Chunghwa Picture Tubes can sell high” in response to “production process issues” that Samsung SDI was having. CHU00028528E (Exhibit 8340E).

²⁶¹ CHU00028930.01E-1.02E (Exhibit 1112E).

²⁶² HDP-CRT00025646E (Exhibit 1533E).

²⁶³ CHU00028786.01E-8E (Exhibit 1293E); M.H. Seong (LG) Deposition, pp. 98-9.

²⁶⁴ CHU00028786.01E-8E (Exhibit 1293E).

²⁶⁵ CHU00029293-7.

In order to stabilize prices, the attendees agreed to adjust production/sales quantity accordingly in response to the over-supply in the market, and they confirmed that the production reduction scale in 14"/20"/21" to be 10%/20%/20%, respectively. Originally, Director Liu had suggested that everyone should reduce production by the same rate, but Korean manufacturers believe that those with larger production capacity and those who have larger loading rate should make greater contribution to production reduction, therefore, the Formula (which explanation was submitted at CDT meeting at the end of July [roughly six weeks earlier]) proposed by Orion's Director Moon shall be used to simulate adjustment of each manufacturer's Q4 sales volume plan as follows [with subsequent calculations about the "preliminary reduction quantity" and the "final reduction quantity.]"²⁶⁶

Regarding the "Q4 Price," the minutes state, "As long as everyone has a common understanding, production reduction and price increase can be done together." The minutes contain the following conclusion:

With respect to the Bottom Price and Production Reduction Plans resolved at this meeting, Mr. Chairman requests the attendees to further evaluate and review them after returning to their respective companies. If there are any questions, feedbacks must be immediately submitted, otherwise, implementation will take place according to the resolution. In order to be successful, Mr. Chairman believes it is necessary to continuously hold monthly meetings to strengthen communication. All meeting representatives agreed to that and temporarily decided to combine the meeting with CDT meeting here after.²⁶⁷

- (93) This document has several features that are significant to an economist. First, the discussion illustrates the collusive nature of the suggested actions. Production cutbacks are not in any of the individual firm's unilateral self-interest but can be successful if there is a "common understanding." Second, the discussion reflects the importance of allocation structures as the Co-conspirators considered how to spread the burden of the reduced production. Third, the need to "continuously hold monthly meetings" speaks to the need of the Co-conspirators for regular contact to be able to monitor the actions they sought to implement.

IV.C.2. Cartel actions on the allocation of collusive gain

- (94) Members of the CRT cartel allocated market shares among themselves, allocated customers among themselves, and allocated the business of individual customers among themselves as a way to manage

²⁶⁶ CHU00029293-7.

²⁶⁷ CHU00029293-7.

the cartel's activities. This conduct is consistent with the allocation structures often implemented by cartels.²⁶⁸ In addition to setting up these allocation structures, cartel members monitored the agreed-upon market shares to prevent and/or resolve deviations. The evidence I have reviewed is consistent with the findings of several government agencies that identified allocation structures as a component of the conspiracy:

- In Samsung SDI's plea agreement with the DOJ, SDI admitted that the "substantive terms" of the conspiracy were to "fix prices, reduce output, and *allocate market shares*"²⁶⁹ (emphasis added).
- The DOJ indicted Cheng Yuan Lin, the former Chair and Chief Executive Officer of Chunghwa Picture Tubes Ltd., "...with conspiring with others to suppress and eliminate competition by fixing prices, reducing output and *allocating market shares* of color display tubes (CDTs) to be sold in the U.S. and elsewhere, beginning at least as early as Jan. 28, 1997, until at least as late as April 7, 2003"²⁷⁰ (emphasis added).
- The KFTC determined that SDI, Chunghwa, LPD, and other conspirators used the glass meetings to fix CDT prices, limit CDT production, and *allocate shares* of the CDT market²⁷¹ (emphasis added).
- The EC found that the CDT cartel "fixed prices, *allocated market shares*, and *customers* and restricted output"²⁷² (emphasis added). According to the EC, "with regard to CPT, the economic aim was to fix prices, *allocate market shares* and restrict output"²⁷³ (emphasis added).

IV.C.2.a. Market share allocations

(95) Members of the CRT cartel took steps to allocate market shares among themselves. The Co-conspirators also took steps to address any discrepancies between the agreed-upon market shares and the actual market shares. For example:

- Chunghwa, LPD, and Samsung SDI agreed on 2004 and 2005 market shares at a March 2, 2005, CRT meeting. The agenda for the meeting contains tables that compare the 2004 agreed-upon or "allocated" "M/S" (i.e., market shares) with the actual 2004 market shares. Further, the table contains the "M/S Gap" (i.e., market share gap) for 2004, which is the difference between the agreed-upon market shares and the actual market shares. The table compares the agreed-upon 2005 market share with the actual results from January and February 2005. The document also

²⁶⁸ See discussion in Section III.B above.

²⁶⁹ Information in United States of America v. Samsung SDI Company, Ltd, Case No. CR 11-0162 (WHA), Amended Plea Agreement, Filed March 18, 2011 (<https://www.justice.gov/atr/case-document/information-us-v-samsung-sdi-company-ltd>).

²⁷⁰ DOJ press release February 10, 2009, *available at* <http://www.justice.gov/opa/pr/2009/February/09-at-110.html>.

²⁷¹ KFTC Decision, pp. 1, 4, 13-14, 28-9, and 46-7.

²⁷² EC CRTs Decision, ¶ 646.

²⁷³ EC CRTs Decision, ¶ 646.

includes a slide with “capacity control guidelines” with a comment that the cartel members “need to speed up capacity control!”²⁷⁴

- Chunghwa, LPD, and SDI agreed on market shares at an August 2003 CRT meeting, with market shares calculated down to the tenth of one percent (e.g., 27.8% for Chunghwa). The agenda for the meeting shows the “2004 Sales Plan,” which is calculated by following the formula “2004 Sales Plan = Target + ’03 Shortfall.” It appears that the 2004 Sales Plan takes into account deviations from the 2003 market share agreement. The agenda notes that “...sales plans still must abide by the set market share allocation...but to be fair, one has to add onto or deduct the amount above or below the negotiated quantity,” implying that if a firm comes in above or below the 2003 market shares, the companies will adjust the 2004 plan accordingly. The document is marked “Classified,” which is circled in the text.²⁷⁵
- Notes summarizing a meeting attended by Samsung SDI, LG, Philips, and Chunghwa report that to preserve the “original M/S as a principle, respective makers must not use the opportunity to acquire original delivery volume of other makers due to price increase.”²⁷⁶

IV.C.2.b. Customer allocations

- (96) The CRT cartel members also took steps to allocate customers and business from specific customers. Some examples include the following:

- Specifically, one of the points discussed at a working meeting attended by Samsung SDI, LG, Orion, Thai CRT, and Chunghwa was, “[D]on’t attack other’s customer by lowering the price.”²⁷⁷ The meeting notes also contain a reference to a geographic market allocation, another type of allocation structure used by cartels. The notes mention a “guarantee of Thai-CRT [that it] operate only in Thai[land].” Because of this, the “attendees agreed that Thai-CRT does not need to reduce production volume. In order to stabilize prices, the attendees agreed to adjust production/sales quantity accordingly in response to the over-supply in the market.” This is the purpose of an allocation structure: the cartel needs to ensure that each co-conspirator gets enough out of the cartel to support continued participation.

²⁷⁴ CHU00608095-105. For additional examples of the firms comparing the “Agreed” versus “Actual” market shares, see the following documents: CHU00647932 –43 at 7935, 7939 and 7941-7942 (the first page of this presentation includes an itinerary with references to a “Green” meeting and a “Top management meeting,” includes “new price guidelines” for specific CRTs, and includes a statement about “keep[ing] the secrets of the Glass meeting”; SDCRT-0088846- 51 at 48-49 (document also provides details for a “line shutdown schedule”); SDCRT-0088763- 72 at 8767; and SDCRT-0091687 – 91 at 1689E.

²⁷⁵ CHU00031194.01E-201E (Exhibit 1187E) at 95.02E–96.01E.

²⁷⁶ CHU00028760E-2E. This is a classic example of the “secret price cutting” concern described in Stigler (1964). See footnote 144.

²⁷⁷ CHU00029293-7.

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- LPD, Chunghwa, and Samsung SDI attended a meeting on November 15, 2004, at which they reviewed market shares for 2004 and 2005. When the “agreed” market shares for 2004 and the market shares for 2005 based on the October 26 GSM’s conclusion were circulated by Yvonne Yun of Chunghwa, Kenny Han of LPD wrote back, “Yes! You are right!!” to confirm.²⁷⁸ The companies “agreed M/S by customer shall be discussed again at the 2nd working meeting on Nov. 24.”²⁷⁹
- On November 24, 2004, Jin Kang Jung of LPD emailed Chunghwa and Samsung SDI an Excel workbook that contained the agreed-upon market shares for Chunghwa, LPD, and Samsung SDI for the following customers (“Yr2005 M/S by customer”): SEC, AOC, LGE, EMC, PH, L-ON, and OTHERS.²⁸⁰
- In February 1998, in a meeting whose content included an “exchange of opinions on price,” Chunghwa and Orion discussed AOC, a customer, “always [taking] advantage of the poor market situation and the delicate relations of market shares among the three suppliers to ask for the lowest prices.”²⁸¹ Chunghwa thought that “communications with Orion should be strengthened” which would allow the firms to “coordinate and cooperate” to “avoid the customers from cutting the price further.”²⁸² Orion and Chunghwa appear to have agreed to a supply allocation for AOC, including “Orion would supply 70K/M [70,000 per month], Chunghwa would supply 60K/M, and [Philips] would supply 50K/M.”²⁸³ In May 1998, Chunghwa and Orion once again discussed the allocation for AOC. The meeting minutes note the shares Chunghwa, Orion, LG, and Philips would each take for 14", 15", and 17" CRTs for April and May 1998.²⁸⁴
- A presentation from an April 2003 meeting contains a detailed analysis of the agreed and actual market shares for Chunghwa, LPD, and Samsung SDI for 2002 and 2003, including a review of quarterly sales by specific CDT product (e.g., 14", 17"FS). The document also shows the “M/S by CEO MTG Decision” (market share determined in the CEO meeting) for the following companies: AOC, BenQ, Compal, Delta, Lite-On, Philips, Tatung, SEC, LGE, Hansol, and Hyundai.²⁸⁵

²⁷⁸ CHU00645156E.

²⁷⁹ CHU00645156E and SDCRT-0090350E-3E (Exhibit 644EF) at 1E.

²⁸⁰ CHU00644987 and CHU00644988.

²⁸¹ CH00028955E-7E (Exhibit 1130E).

²⁸² CH00028955E-7E (Exhibit 1130E).

²⁸³ CH00028955E-7E (Exhibit 1130E). The heading of this section of the minutes is “A.O.C. sales coordination.” And it ends with a comment that “[Orion] only wants to maintain its original share; the most important thing is to maintain the prices.”

²⁸⁴ CHU00028952E-4E (Exhibit 1132E).

For additional examples of the firms agreeing to market shares for specific companies, *see*: CHU00030763E -65E at 0764E-0765E; SDCRT-0002488-9.

²⁸⁵ CHU00660539 - 48 at 45-46.

For additional documents showing the firms splitting up the industry-wide market share as well as specific customers, *see* CHU00660561 - 74 at 69.

- In another example from a glass meeting: “With Thai-CRT/TEDI’s promise that they would not grab Chunghwa Picture Tube’s M/S orders (maintained at the original 50% [for a specific customer]) and that they will follow the prices, the Korean makers requested Chunghwa Picture Tube to take the lead in the price up to USD 32.00/pcs....”²⁸⁶

- (97) The above individual examples indicate that the CRT Co-conspirators used allocation structures so that they would all benefit from the suppression of rivalry. The record also includes examples where the Co-conspirators sought to share potential losses as well. For example, notes from a meeting on January 9, 1999, state: “While the market situation is poor, it is hoped that all the makers will evenly bear the losses resulting from the fall in sales volumes.”²⁸⁷ This provides yet another example of behavior consistent with the existence of a collusive agreement.

IV.C.3. Cartel actions on monitoring and enforcement

- (98) As I described in Section III, Nobel Laureate George Stigler identifies secret price cutting as the key problem that must be solved by a cartel.²⁸⁸ Cartels use monitoring and enforcement structures to minimize deviations from the cartel agreements, detect them if and/or when they do occur, and punish deviating members to maintain/prolong/extend the cartel agreements. The importance of monitoring and enforcing the cartel agreement is noted in my own research and throughout the economics literature. As explained in a paper from 2006:

[S]uccessful cartels do not simply rely on ex post punishments. Instead, they invest in monitoring mechanisms, such as joint sales agencies or *regular reporting to one another* or third parties. Cartels much prefer to develop the means to monitor each other’s behavior in order to deter or physically prevent cheating, rather than resorting to expensive punishments such as price wars. Designing effective monitoring mechanisms takes place over time as *cartels...refine the organizational structure to provide the necessary incentives and information to sustain cooperation. For example, successful cartels will often develop a hierarchy, separating high level policy decisions made by executives from the more frequent ongoing monitoring and negotiations by lower-level managers*²⁸⁹ (emphasis added).

- (99) Monitoring and enforcement structures take many forms, several of which are apparent in the evidence in this case. Consistent with Levenstein and Suslow’s observations, personnel from the CRT Co-conspirators were in frequent contact with one another through a hierarchy of top-level meetings

²⁸⁶ CHU00029259.01E – 61.02E at 61.01E.

²⁸⁷ CHU00030695E 697 (Exhibit 1301E).

²⁸⁸ See Stigler (1964) at 1469.

²⁸⁹ Levenstein and Suslow (2006), 44.

designed to develop mutual trust among the Co-conspirators' top leadership, management meetings, working-level meetings, and other inter-company communications that developed over time. As I described in Section IV.C, these meetings involved detailed conversations about current and future prices to be charged to specific customers, production levels, and other competitively sensitive information. The occurrence of these meetings themselves and their frequency is evidence of the presence of monitoring and enforcement structures.

- (100) The notes taken at management and working-level glass meetings provide additional insight into how the cartel members followed up on "conclusions" or "resolutions" from previous cartel meetings to determine whether they had been implemented. For example, the notes from a May 1997 working-level meeting contain the following discussion:

Additionally, with regard to [specific customers], CPT questioned SDD/LG for their petty actions and for not abiding by the price bottom line in April. After SDD's explanation and LG's firm denial, the meeting attendees from PH/SDD/LG/ORION all agreed that starting in May the Bottom Price of 14" MPRII will be USD72.00/pc (but ORION's actual sales price will be reviewed again to see whether it can be the same price as others).²⁹⁰

- (101) Similarly, notes from a January 2002 meeting indicate that Chunghwa and Samsung SDI discussed allegations that Samsung SDI "grab[bed] orders...by lowering prices," to which Samsung SDI reported with the specific price it quoted (\$25.50) and a comment that "although the customer had requested a price reduction, that has not been approved."²⁹¹ Furthermore, the minutes indicate that Samsung SDI would "reconfirm the sales prices," and "readjust the price back to the agreed prices" "[i]f low pricing can be proven."²⁹²
- (102) Deposition testimony from Chunghwa's C.C. Liu confirms that the economic theory underlying the importance of monitoring and enforcement structures played out in the CRT cartel and that these structures were at least somewhat effective in deterring cheating:

²⁹⁰ CHU00028730E-3E (Exhibit 1106E).

²⁹¹ CHU00036392 (Exhibit 1183E).

Exchanging customer and product-specific price information between two purported competitors is not in Samsung SDI's unilateral self-interest and is pro-collusive. By providing its current price for 14" CRTs for a particular customer to Chunghwa, Samsung SDI would be telling a potential competitor exactly the price it has to beat to take the business. As the meeting minutes suggest here, Samsung SDI did so to demonstrate adherence to the cartel agreement and offered to alter its pricing if it had undercut Chunghwa.

²⁹² CHU00036392 (Exhibit 1183E).

Examples in which the Co-conspirators address and attempt to resolve instances of alleged cheating and/or prices that are perceived to be lower than the agreed-upon levels include CHU00030679E-83E (Exhibit 1312E), CHU00028252E-3E (Exhibits 1131EF); CHU00030695.01E-7.02E (Exhibit 1301E); CHU00028209.01E-10E (Exhibit 1161E); CHU00031142.01E-7E (Exhibit 1175E); CHU00028968.01E-9E (Exhibit 1326E); CHU00029228.01E-30E (Exhibit 1144EF); CHU00036410.01E-11E (Exhibit 1178E); and CHU00660366E-8E (Exhibit 1179E); CHU00014202E.

Q. And what did the group do when it was suspected that one of the competitors was cheating on the agreement?

A. Before the meetings evidence would be collected. We would find evidence to challenge this suspect at the meetings, "How could you do this?" To offer this company a chance to clarify or make improvements.

Q. Did you find that mechanism effective to bring companies back in line?

A. Under enormous pressures some effects could be achieved. However, it was not 100 percent effective, otherwise every one of us would have made a great fortune.

Q. And Mr. Liu, do you believe that being called out by your competitors was an enormous pressure?

A. Certainly.²⁹³

- (103) The cartel also monitored the quantity sold by its members at the glass meetings and questioned one another about their relative sales. At a February 24, 2000, meeting where the topic was "CDT Market Information Exchange and Price & Production Volume Review," the meeting minutes reflect monthly sales figures by CRT size (i.e., 14", 15", 17", and 19") by company for January and February.²⁹⁴ According to the minutes, "LG Mr. Choi complained that Chunghwa Picture Tubes' sales figures for the 17" for January and February increased more than that of the other makers. Director Liu explained that it is because of a boost in orders from Medion and because some customers' production had moved forward. Orders from customers in March will relatively decrease."²⁹⁵
- (104) The minutes from this meeting also reflect enforcement of a "resolved" production shutdown for March 2000. According to the notes, Philips, Chunghwa, Samsung SDI, LG, and Orion "resolved" to specific production stoppages (5 days for 17" and 10 days for 15"), although LG and Orion "claimed that it was necessary to obtain consent from the labor union before arranging for the number of production stoppage days."²⁹⁶ The notes reflect that "If LG/OEC cannot reach an agreement concerning stoppage days by March, then those days must be made up in subsequent months."²⁹⁷

²⁹³ C.C. Liu (Chunghwa) Deposition, p. 368-69.

²⁹⁴ The minutes indicate that Philips presented this information for the meeting attendees. *See* CHU00030965.01E.

²⁹⁵ CHU00030965.01E. *See also* SDCRT-0090306; CHU00031249.

²⁹⁶ CHU00030965.01E.

²⁹⁷ CHU00030965.01E.

For another example of monitoring and enforcement of market share levels, *see* CHU00030701 (Exhibit 1137EF) at CHU00030702.01E (In response to claims from Philips that Samsung SDI had not reduced production in China, Mr. Inn Kim indicated that he "would investigate and find out the truth himself. Hopefully others would give him some time. If proved to be true upon investigation, it will be corrected. If each maker still faces the above situation at the next high level meeting, then everybody can discuss how to respond. It's okay even if the conclusion is to Shut Down SDD

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- (105) The CRT cartel took steps beyond discussions at meetings and follow-up investigations to monitor compliance. As C.C. Liu testified, the cartel used “site visits” to ensure that the conspirators did reduce output in line with their agreements at the glass meetings.²⁹⁸
- (106) In its decision, the KFTC included a statement from “General Manager Lee of Samsung SDI” that confirmed the existence and purpose of the audits, including his participation in them:

In order to maintain the sales prices at a certain level, the excess supply had to be resolved. For this, the companies agreed to jointly control the supply. So during the early 2000s, the companies submitted the monthly closing days to stop operation on specific number of days, to notify the designated personnel in other companies, and to allow these people to actually visit the companies to check whether the agreements were being implemented. I visited competitors’ factories on line audits in the first half of 1999. Also, I remember that the people from Chunghwa Picture Tubes and LPD visited our company²⁹⁹ (emphasis in original).

- (107) Economics does not offer any pro-competitive justifications for a firm to allow a “competitor” in its own industry to enter its factory, observe what products are being manufactured on various production lines, and confirm whether certain production lines have been shuttered. In contrast, there are pro-collusive justifications for doing so because conspirators can monitor one another’s production and output, as was done in this matter and noted by C.C. Liu and the KFTC. Minutes from the glass meetings indicate that future audit plans were discussed. For example, notes from a glass meeting on August 27, 1999, state: “Meeting attendees agreed that, in order to effectively ensure price level, 17” tube production shutdown period needs to be at least 5 days in September. Each maker will provide a production stoppage plan before 8/24, *and complete Audit plans for related factory zone before 8/28*” (emphasis added).³⁰⁰

(Shenzhen)” (emphasis in original).

CHU00608095 and CH000031194E – 201E (Exhibit 1187E) are examples of how Chunghwa, LPD, and Samsung SDI set relative market shares among themselves, compared those to actual sales, and made adjustments in a future year’s sales plan to “be fair” and “add onto or deduct the amount above or below the negotiated quantity as calculated in the table below.”

²⁹⁸ Q. During the period of time 1995 to 2005, when you left, did Chunghwa reduce output in accordance to agreements reached at the glass meetings?

A. We did.

Q. Was there a method by which the participants in the glass meetings could verify that the other participants were reducing their output?

A. We had methods.

Q. And what were those methods?

A. Site visit at their factories.

C.C. Liu (Chunghwa) Deposition, p. 80.

²⁹⁹ KFTC decision at ¶39.

³⁰⁰ CHU00030835E – 8E (Exhibit 1150E).

- (108) Notes from cartel meetings indicate that production audits took place and were reviewed by the conspirators. For example, a “report on the results of the 5 CDT companies’ management meeting” on June 23, 1999, notes that the attendees reviewed the “results of the monitoring of Philips’ Dapon factory” and confirmed that “#1, 19”, #5 17” lines not operating.”³⁰¹ The notes from another cartel meeting on July 28, 1999, report, “Various makers reported the number of stoppage days as shown in the attachment. They needed to verify Audit plans and send them to PH [Philips] for compilation before Friday.”³⁰² Attached to the meeting minutes is a table labeled “17” CMT Production Control & Auditing Plan—August 1999” that lays out a day-by-day audit plan, including the production facilities and lines to be audited and who the auditor would be.³⁰³
- (109) The record also contains reports of the factory audits that took place. A document produced by Chunghwa reflects that two of its employees (Ching-Yuan (Michael) Du and Chu Xiangguo) audited an LG factory, Samsung SDI factory, and Orion factory all on August 22, 1999.³⁰⁴ Their notes confirmed that:
- “Today LG CRT factory is completely shut down. Only a team level staff member, Mr Seong was scheduled to conduct the tour inside the factory. There were altogether 4 CDT production lines ...situated in 2 factory buildings. After actually touring the inside of the factory to Check various stations such as Mask Preparation, Screen Coating, Frit Sealing, Exhausting, and ITC in various 17” production lines specially designated, LG today truly stopped their machines. There were only maintenance personnel doing maintenance of equipment at the production lines.”
 - “Samsung Suwon factory is situated about one hour's drive south of Seoul; This factory has altogether six production lines as follows... 17” in Line#3 and Line#5 were all shutdown and in maintenance status.”
 - “Orion Kumi factory CDT part had 4 production lines... all in one factory building.... Today, the entire factory is shut down. As we toured the inside of the factory and Check various stations such as Mask Preparation, Screen Coating, Frit Sealing, Exhausting, and ITC, all were shutdown and in maintenance status.”³⁰⁵
- (110) The detailed factory audits and frequent discussions and meetings among the parties are classic examples of the monitoring and enforcement structures discussed in the economic literature. To an

³⁰¹ SDCRT-0086641 – 45 (Exhibit 1896E).

³⁰² CHU00030807E – 815E (Exhibit 1149EF).

³⁰³ CHU00030807E – 815E (Exhibit 1149EF). Another example of a “Production Control & Auditing Plan” for May 1999 can be found at CHU00030757 – 62 (Exhibit 1145EF), meeting minutes from a May 12, 1999 “CDT Regular Exchange Meeting.”

³⁰⁴ CHU00030839E-840E (Exhibit 1212E).

³⁰⁵ CHU00030839E-840E (Exhibit 1212E).

For other examples of documents discussing factory audits, *see* CHU00030998E (Exhibit 1317E), CHU00029191E-94E (Exhibit 1108EF), CHU00030985E-990E (Exhibit 1316E), and SDCRT0086584-85 (Exhibit 1892E).

economist, the fact that a Co-conspirator would allow one of the other Co-conspirators to audit and report on its production status indicates that (1) the cartel members had committed to reducing production (as the meeting minutes suggest they had), (2) there was mutual understanding among the cartel members regarding the expectations for reducing production, and (3) they took those commitments seriously enough to show their fellow cartel members that they were complying. This behavior is consistent with the existence of a cartel and inconsistent with the Co-conspirators' unilateral self-interest. Knowledge of a production restriction by rivals creates an incentive to engage in attempts at business stealing. Given that other firms are restricting production relative to non-collusive levels, it is in a firm's unilateral self-interest to expand production to capture incremental sales at prices above the non-collusive level. Furthermore, in the absence of an agreement of mutual restraint, it would not be in a firm's unilateral self-interest to reveal to its rivals that it had restricted production relative to non-collusive levels, because the firm restricting production would recognize the incentives that would create for its rivals to expand their output at the expense of the firm engaging in the production restriction.

- (111) There is some evidence that the Co-conspirators claim to have provided misleading or incorrect production information to the other members of the cartel, including misleading a Co-conspirator that audited another Co-conspirator's production facilities. For example, Mr. Song of Samsung SDI claimed that "the numbers [SDI] submitted were vastly different from the actual numbers. [SDI], in turn, did not expect that the competitors were providing us with the exact numbers."³⁰⁶ While this may have happened from time to time, the observation that there may have been some cheating is consistent with the economic literature on cartels, is not unexpected, and does not mean the cartel was ineffective. As I noted above, cheating may well have been a "...reality of running the organization—but not a cause of death."³⁰⁷ Even if some of the information being exchanged was not entirely accurate, the CRT Co-conspirators continued to meet and exchange competitively sensitive information on prices and units sold to specific customers, production levels, etc. with one another multiple times a year for more than a decade. If the information exchanged was systematically inaccurate, the repeated nature of the interactions suggests that the Co-conspirators figured out how to use that information to continue to plan the activities of the cartel. It defies economic logic that the Co-conspirators would incur the costs to attend these meetings and take on the legal and financial risk of getting caught if they did not find it effective.

³⁰⁶ Deposition of In Hwan Song, December 14, 2012, pp. 121, 285. *See also* Deposition of Masaki Sanogaway, August 1, 2013, p. 220; Deposition of Masaki Sanogaway, August 2, 2013, p. 507-508; Deposition of Deok-Yun Kim, March 21, 2013, pp.17, 31, 36, 77; Deposition of Hoon Choi, June 20, 2013, pp. 209, 234-5, 265.

³⁰⁷ Margaret C. Levenstein and Valerie Y. Suslow, "Breaking Up Is Hard to Do: Determinants of Cartel Duration," *Journal of Law and Economics* 54, no. 2 (2011): 470. *See also id.* At 477 ("Cartels do not want to disrupt collusion...even sometimes when they know that a firm has cheated.") and 485 ("Many cartels suffer from a little cheating; this cheating does not result in punishment, let alone cartel death.").

IV.D. Scope of the cartel: CDT vs. CPT

- (112) Although at times during the Class Period there were separate CDT and CPT meetings, from an economic perspective the CRT cartel was a single cartel addressing two related products. When a decision was made to split into separate CDT and CPT meetings in May 2000, part of the motivation appears to have been that the meeting attendees were concerned about “meeting content leaking out.”³⁰⁸ At a May 26, 2000, meeting attended by Chunghwa, Samsung SDI, LGE, Orion, and Philips, the companies “agreed to reduce the attendees’ number from 4 to 2-3”, and that “CDT and CPTs GSM should be held separately after June 20 to avoid more attendees gossiping, which leaks the meeting contents.”³⁰⁹ In other words, the split between the meetings was motivated, at least in part, by the goal of keeping the meetings secret and prolonging the effectiveness of the cartel.
- (113) Furthermore, as Jim Smith of Philips testified, the meetings were really just “separate in terms of agenda...most of the participants were the same.”³¹⁰ Further, both Jim Smith and C.C. Liu of Chunghwa testified that the CDT and CPT meetings could be held on the same day, or only a day apart.³¹¹ For example, C.C. Liu, Michael Du, and S.J. Yang of Chunghwa, In Kim of SDI, S.Y. Chio and K.Y. Yo of LGE, H.K. Cho of Orion, and Jim Smith and Jerry Lin of Philips attended both the CDT and CPT Glass meetings on June 20, 2000.³¹²
- (114) In addition, CDTs and CPTs are supply-side substitutes. In other words, the Co-conspirators could switch their production between products depending on the market conditions.³¹³ Many of the Co-conspirators’ lines could produce both CDTs and CPTs and could convert between CDTs and CPTs in about a half day.³¹⁴ Given the interchangeability of CDT and CPT production, it would be difficult

³⁰⁸ CHU00031006E, Exhibit 1307E.

³⁰⁹ CHU00031006E, Exhibit 1307E.

³¹⁰ Deposition of Jim Smith (Philips), December 12, 2013 (Jim Smith (Philips) Deposition), p. 104.

³¹¹ Jim Smith (Philips) Deposition, p. 149, 204; C.C. Liu (Chunghwa) Deposition, p. 75.

³¹² For additional examples of meeting attendees going to both the CDT and CPT glass meetings and glass meetings occurring on the same day or day after each other, see CHU00029131.01E–7E (Exhibits 710E) (May 25, 2000) vis-à-vis CHU00031006.01E–9.02E (Exhibit 1307E) (May 26, 2000, proposing CDT and CPT meetings on the same day in in July 2000); CHU00031075.01E–87E (Exhibit 1167E) vis-à-vis CHU00028975.01E–6.02E (Exhibit 1168E).

³¹³ C.C. Liu (Chunghwa) Deposition, p. 34:

Q. Okay. And number 1 where it’s “CPTT”, when you manufactured both CPTs and CDTs, how many different lines of each did you have?

A. Oh, it’s hard to say. Depends market: we have to modify this to this, this to that. I cannot remember.

Q. Okay. So, if you had – so depending on the market, you would adjust your lines to CPTs and CDTs; is that correct?

A. Correct.

CHU00028516.01E–8E, Exhibit 2601E: Panasonic explained to Chunghwa that if demand for CDTs is low, then CDT capacity can be converted to wide size CPT to take advantage of the increased demand.

³¹⁴ Jae In Lee (Samsung SDI) Deposition (2012), p. 113-4.

CHU00031274 – 77 at 75.02E (Exhibit 1199E) (notes summarizing a September 20-21, 2004, meeting attended by LPD, Samsung SDI, and Chunghwa): “Regarding next year’s production capacity control and production line shut-down plans: since the methods used to calculate were different, SDI has CPT/CDT shared line that is hard to differentiate, therefore, each maker needs to review the actual number of their lines and the production capacity of each line. At the

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to operate separate cartels effectively. For example, if the cartel decided to limit CDT production, the Co-conspirators would have an incentive to shift those unused lines to produce CPTs. However, expanding CPT production could drive both CPT prices and the firms' profits down. Given that the Co-conspirators were meeting to suppress rivalry for both CPTs and CDTs, it makes economic sense that the firms would have coordinated their actions on both products together.

next meeting, resolution shall be made by all makers to determine how many lines each should be reduced.”

CHU00029235 – 37: “SDDM: Starting from April the original #5 14"/16" CPT stop production and the line is changed to 50% CPT & 50% 17" CDT.”

For other examples of production lines being able to produce CDTs and CPTs *see*: BMCC-CRT000057539, PHLP-CRT-039880, MTPD-0455816, PHLP-CRT-095826.

V. The evidence is consistent with effective collusion by the Co-conspirators, including Mitsubishi

- (115) As I have explained above, explicit collusion is an agreement to suppress rivalry among competitors that involves communication and/or transfers. If conspirators do this effectively, prices will be higher than they would have been in the absence of the collusion, resulting in increased profits. The effect of cartels on prices has been extensively studied by economists. Studies in the economic literature have found that the typical overcharges from cartels are in the range of 20%–40%.³¹⁵
- (116) As discussed throughout this report, there is extensive evidence of communication and exchanging competitively sensitive information between the Co-conspirators, including Mitsubishi. Strictly speaking, the existence of agreements to fix prices or restrict supply does not necessarily imply that the agreements were effective. However, an economic analysis of the evidence in the matter at hand is consistent with an effective cartel.
- (117) The effective suppression of inter-firm rivalry was in the Co-conspirators' collective interest. As explained above, economic theory demonstrates that the suppression of inter-firm rivalry can collectively benefit colluding firms. The Co-conspirators themselves commented on the benefits of effective collusion. For example, as explained by C.C. Liu of Chunghwa, "In order to prevent serious losses, to maintain long-term stability in the industry, the best way is for everyone to maintain a price."³¹⁶ As explained by Mr. Lee of Samsung SDI, "In order to maintain the sales prices at a certain level, the excess supply had to be resolved. For this, the companies agreed to jointly control the supply"³¹⁷ (emphasis in original).
- (118) The evidence indicates that structures to support effective collusion described in Section III were in place. This evidence is the focus of Section IV.C above.

³¹⁵ See, e.g., "Antitrust Modernization Committee Report and Recommendation," Apr. 2, 2007, pp. 301, 307; Margaret C. Levenstein and Valerie Y. Suslow, "What Determines Cartel Success?" *Journal of Economic Literature*, 44(1) (2006): 80; John M. Connor and Robert H. Lande, "How High Do Cartels Raise Prices? Implications for Optimal Cartel Fines," 80 *Tul. L. Rev.* 513 (2005): 540–41; Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, 4th ed., (Addison Wesley, 2005), p. 143; Richard A. Posner, *Antitrust Law*, 2nd Edition, (Chicago: University of Chicago Press, 2001); Gregory J. Werden, "The Effects of Antitrust Policy on Consumer Welfare: What Crandall and Winston Overlook," Economic Analysis Group, Antitrust Div., U.S. Department of Justice, Discussion Paper EAG 03-2, 2003; James M. Griffin, "Previous Cartel Experience: Any Lessons for OPEC?" in *Economics in Theory and Practice: An Eclectic Approach* 179 (L.R. Klein and J. Marquez eds., 1989); Organization for Economic Cooperation & Development, "Report on the Nature and Impact of Hard Core Cartels and Sanctions Against Cartels Under National Competition Laws," Annex A (2002), 21–23. Marcel Boyer and Rachidi Kotchoni, "How Much Do Cartels Typically Overcharge?" CIRANO Scientific Publications 2012s-15, CIRANO, May 2012.

³¹⁶ C.C. Liu (Chunghwa) Deposition, p. 51.

³¹⁷ KFTC Decision, p. 19, Table 11.

- (119) It would not make economic sense for the Co-conspirators and all the individuals involved to have, year after year, put in the time and effort required to arrange and participate in the meetings and other communications, at the expense of other business activities that would have benefited their companies, if they did not believe that the cartel was effective. The evidence related to this cartel reflects an exceptional array of meetings and communications occurring regularly for more than a decade. This includes numerous of documented group meetings attended by senior executives of numerous Co-conspirators. Moreover, the record also reflects many additional bilateral meetings and other communications between Co-conspirators.
- (120) Moreover, as discussed above, the Co-conspirators' comments indicate they recognized that their actions created a legal risk associated with violating antitrust laws. Chunghwa meeting minutes from a working-level glass meeting reflect that someone crossed out by hand the meeting's topic—"Working level glass meeting"—and the names of the "Attending Parties," which included LPD, Samsung SDI, ISD, and Chunghwa, and note that "holding meetings with peers in the industry violates free market mechanism" and "it is not suitable to leave any evidence on paper."³¹⁸ Meeting notes from the "CDT Industry Meeting" on July 18, 1998, indicate that the Japanese companies showed "caution against ANTITRUST LAWS."³¹⁹ Meeting minutes produced by Samsung SDI from a March 8, 1999, meeting include a note at the top to "Please dispose of this material after reading it."³²⁰ The Co-conspirators also took active steps to avoid being detected.³²¹ It does not make economic sense that the Co-conspirators would have knowingly created this legal risk over an extended period of time if they did not believe that their actions were having the desired effect of raising prices. As a widely used undergraduate economics textbook has explained:

Only if a cartel is expected to raise the price above the noncartel price and keep it high do firms join. If the noncartel price is close to the cartel price, then firms may not believe that joining the cartel is profitable given the legal liability they potentially face from belonging to a cartel.³²²

³¹⁸ CHU00578883.01E-5E (Exhibit 1871EF). This is just one of many notes in this particular document that reflect text that has been crossed out by hand. For example, "~~Heard that~~ Philip's China market demand is strong" and "~~working level glass meeting~~" (modifications in original).

³¹⁹ SDCRT-0086416E-8E.

³²⁰ SDCRT-0086563E-6E and SDCRT-0086557 (Exhibit 1528EF)

³²¹ C.C. Liu (Chunghwa) Deposition, pp. 93-94.

Q. Between 1995 and 2005 did the group meeting participants do anything to keep the meetings secret?

A. Certainly.

Q. What type of things did you do to make sure that the meetings would not be disclosed?

A. What we did was that not many people were assigned to attend such meetings and these assigned people should not be changed frequently and meetings shall not be discussed among CPT peoples internally. Externally when we had meetings in hotels, no group entry at the same time; we should walk into the meeting venue separately. Also no public information board on sight in the hotel."

³²² Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, 4th ed., (Addison Wesley, 2005), 131 and footnote

(121) The conspirators themselves frequently made statements indicating that their communications and coordination had successfully affected the prices for CRTs. For example:

- Notes from a meeting in November 1999 state, “Each maker indicated that because of the success of Glass Meeting, everybody has been Enjoying Business this year.”³²³
- C.C. Liu of Chunghwa stated, “Talking with Competitor regularly is very fruitful.”³²⁴
- In various discussions in August 1998, C.C. Liu claimed that “China and Korea makers have successfully adjusted prices beginning 1Q of August,” they would “increase the price again in October,” and the “price increase has effectively been implemented.”³²⁵
- Notes from a September 1999 meeting claim, “All makers expressed that the current production and sales volume are still good and the prices in August has been successfully increased in accordance with the *Agreed Price*”³²⁶ (italics in original).
- In notes from an October 1999 meeting, Mr. Lin of LG claims that “the 17" price has been able to keep at a price no less than \$90 because of the Glass Meeting”³²⁷ (emphasis in original).
- Notes from another October 1999 meeting report a “Price-up trend in European & American market thanks to capacity reduction in Asia.” C.C. Liu of Chunghwa confirmed that prices were elevated as a result of the Co-conspirators’ meetings.³²⁸
- Chunghwa meeting minutes from a June 2000 meeting with SDI, LG, Orion, Philips, and Thai CRT state that the price hike for 14" and 20" CRTs “was, in general, successful.”³²⁹

9.

³²³ CH000030899 - 903 at 902 (Exhibit 1155E).

³²⁴ CHU000028283E - 85E (Exhibit 1119E).

³²⁵ CHU00028385E-7E at 6E (Exhibit 1135EF); CHU00028463E-4E at 4E (Exhibit 1133E).

³²⁶ CHU00030855.01E-68E at 55.02E (Exhibit 1152EF).

³²⁷ CHU00030888.01E-93.02E (Exhibit 1154E).

³²⁸ C.C. Liu (Chunghwa) Deposition, pp. 362-65.

Q. And can you tell me, sir, what is reported in this group meeting report regarding price trends in Europe and American markets?

THE WITNESS: There are indications of price rise trends in — for products sold to the United States and Europe.

Q. And when you say “price rise trends” is it that prices were going up for products sold to the United States and Europe, sir?

THE WITNESS: Yes, language here says that clearly.

Q. And what is — why are prices going up, sir? In the European and American markets?

THE WITNESS: It says clearly here due to reduced production in Asia the capacity was not going up but down.

Q. Do you agree, Mr. Liu, that in times of over-supply these group competitor meetings helped keep prices from falling as much as they would have?

THE WITNESS: Agree.

Q. And when there was a shortage of tubes, sir, do you agree that these group competitor meetings allowed suppliers to raise prices faster?

THE WITNESS: Agreed.”

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- Notes from a January 2002 meeting report that some customers did not agree with the price increases but “they are beginning to understand that it is inevitable. With the willingness and confidence of each CDT maker attending the meeting, the price increase for monitor factories should run smoothly this time.”³³⁰
- An email from February 2002 discussing the outcome when “3 major makers got together in Taiwan on February 22” reports, “It was confirmed that the price increases for February and beyond were successful.”³³¹
- A statement from Chunghwa’s president to the KFTC, made on May 14, 2008, also suggests the Co-conspirators were effective in elevating prices: “I think that even if the information disclosed in the CDT multi-party meetings was not always accurate, such information helped all the participants. The information obtained through the CDT multi-party meetings was each company’s confidential sales information not disclosed in the marketplace. **I believed that such information allowed us to prevent the price from falling further, ensuring that we receive a higher price**”³³² (emphasis in original).

(122) In addition to the cartel member’s own statements, the EC specifically commented on the cartel’s effectiveness:

Even if it is not necessary to show any anti-competitive effects where the anticompetitive object of a [sic] conduct is proven, the Commission considers that the facts as established in Section 4 are indications of anti-competitive effects of the cartel arrangements as a whole, comprising agreements and concerted practices. It is, in fact, proven in this case, that the undertakings involved agreed to fix prices, and actually attempted, and at various times succeeded, in raising their prices...for CDT...and for CPT; agreed to restrict output and actually attempted, and at various times succeeded, in restricting output...for CDT...and for CPT; agreed upon market

³²⁹ CHU00029116.01E-23E (Exhibit 709EF).

³³⁰ CHU00031178.01E-9.02E (Exhibit 1182E) at 9.02E.

³³¹ TSB-CRT-00041862E-3E (Exhibit 1787E) at 2E.

³³² KFTC Decision at ¶33.

For additional examples of the defendants recognizing the cartel’s impact on prices, *see*:

- CHU00030701.01E-4.02E (Exhibit 1137EF): “**The conclusion of the 17" CDT price increase: proceeding smoothly; each maker has increased prices since January 16**” (emphasis in original);
- CH00030855.01E (Exhibit 1152EF): “the prices in August had been successfully increased in accordance with the agreed price”;
- SDCRT0086557E (Exhibit 1528EF): “All companies successfully completed price increase”.
- SDCRT-0086416-418: “Although most monitor manufacturers acknowledge the inevitability of the price increase, they are surprised by the increase of more than 15%, which is high. (They are demanding a buffer period for the price increase.) Generally, they reacted positively.”
- CHU00028746E – 48E (Exhibit 1118E): “In terms of price increase for 14" CDT, the meeting attendees all said that the customers all more or less accepted, no problem.”

shares, both with respect to concrete markets and regions and specific customers ...for CDT...and for CPT; monitored the implementation of the agreements ...for CDT...and for CPT and exchanged commercially sensitive information...³³³
(emphasis added).

- (123) Evidence suggesting that the cartel faced some challenges or experienced some episodes of “cheating” or “deviations” does not necessarily indicate that the agreements had little to no effect. Cartels do not require strict adherence to the conspiratorial agreements. Economic theory and economists’ examination of past cartels indicate that periods of cheating can, and may even be expected to, occur during the operation of effective cartels. As I explained above, the CRT cartel took regular steps to monitor the participants’ adherence to the agreements, and when potential deviations occurred, the Co-conspirators took active steps to bring participants back in line.³³⁴
- (124) Economists have studied the extent to which cartels have been able to overcome these challenges. As one study explains, “Cartels do face challenges...Overcoming these challenges is easier in some industries than others...But successful cartels have operated in a wide variety of industries by developing organizations that can overcome these challenges.”³³⁵ These studies have also demonstrated that ineffective cartels tend to not last, while cartels that last longer have found ways to effectively “overcome these challenges.” Notably, the CRT cartel lasted many years longer than most other cartels included in these studies, indicating that the CRT cartel was unusually durable.³³⁶

³³³ EC CRTs Decision, ¶698.

³³⁴ See, e.g., the discussion in Section IV.C.3.

³³⁵ See Levenstein and Suslow (2006), p. 44.

³³⁶ See Levenstein and Suslow (2006), pp. 49-57.

VI. Mitsubishi's conduct is inconsistent with its unilateral self-interest and consistent with participation in a cartel

VI.A. Mitsubishi overview

- (125) Mitsubishi manufactured and sold CPTs for televisions, CDTs for computer monitors, and CRT products—color TVs containing CPTs and computer monitors containing CDTs—during the Class Period.³³⁷
- (126) Mitsubishi manufactured CPTs for its own CRT television business at production facilities in Japan and Canada.³³⁸ All the CPTs incorporated in Mitsubishi color TVs were shadow mask tubes.³³⁹ Mitsubishi stopped producing CPTs in 1998³⁴⁰ but did continue to produce color TVs using CPTs purchased from other CRT tube manufacturers such as Hitachi, Panasonic, Toshiba, Samsung SDI, LPD, and LGE.³⁴¹ Prior to halting CPT production, Mitsubishi sold CPTs to other CRT TV manufacturers in addition to its own internal consumption.³⁴²
- (127) Mitsubishi manufactured CDTs at production facilities in Japan and Mexico.³⁴³ From 1987 to 2004, Mitsubishi manufactured CDTs and computer monitors in Japan.³⁴⁴ In 1998, Mitsubishi opened a

³³⁷ 30(b)(6) Deposition of Kenzaburo Hara (Mitsubishi Electric Corporation) 28:11–32:8.

³³⁸ Mitsubishi Electric Corporation's Supplemental Response to Direct Action Plaintiffs' First Set of Interrogatories, No. 12 (Sept. 5, 2014) ("Mitsubishi Electric asserts that as of 1995, CDTs and CPTs were manufactured in Mitsubishi Electric's factory CRT Works, televisions were manufactured in Mitsubishi Electric's factory Kyoto Works, and monitors were manufactured in Nagasaki"); 30(b)(6) Deposition of Hitoshi Tsukamoto (Mitsubishi Electric Corporation), September 22–23, 2014 (Tsukamoto (Mitsubishi) Deposition) p. 37:13–15 (MELCO manufactured CPTs in "Kyoto, Japan, and Canada"); 30(b)(6) Deposition of Kenzaburo Hara (Mitsubishi Electric Corporation) 29:2–5 ("CPTs for television sets were . . . transported from a subsidiary in Canada into the United States").

³³⁹ Hideo Innami (Mitsubishi) Deposition 180:11–12 ("It was all shadow mask. All the tubes for television were shadow mask, 100 percent.").

³⁴⁰ Mitsubishi Electric Defendants' Supplemental Responses and Objections to Direct Purchaser Plaintiff Studio Spectrum, Inc.'s First Set of Interrogatories, No. 5 (May 27, 2016) ("[i]n or about 1998, Mitsubishi Electric stopped manufacturing CPTs altogether"); Hideo Innami (Mitsubishi) Deposition 181:7–12 (CPT production lines in Japan shut down in "[e]arly part of '98"; the last shadow mask CPT sold by Mitsubishi "[a]round early '98").

³⁴¹ Mitsubishi Electric Defendants' Supplemental Responses and Objections to Direct Purchaser Plaintiff Studio Spectrum, Inc.'s First Set of Interrogatories, No. 5 (May 27, 2016) ("to the extent they still made or sold color television sets, Mitsubishi Electric incorporated into those products the CPTs it had purchased from other CPT manufacturers"); Mitsubishi Electric Corporation's Supplemental Response to Direct Purchaser Plaintiffs' First Set of Interrogatories, No. 14 (Jan. 16, 2015) ("Annual Estimated Purchases by MELCO" for years 1997–2003; "Annual CPT Purchases by MELCO" for years 2004–2007; "Annual CDT Purchases by MELCO" for years 2004–2007.").

See also Exhibit 2649 (HITDOJCRTCIV00000037–47), TAEC-CRT-00016371, and sales data provided by the Co-conspirators (Panasonic, Samsung SDI, LPD, and LGE).

³⁴² Mitsubishi Electric Corporation's Supplemental Response to Direct Action Plaintiffs' First Set of Interrogatories, No. 4 (Sept. 5, 2014) ("During the alleged conspiracy period, Mitsubishi Electric sold CRTs to other Mitsubishi Electric subsidiaries and to other CRT Product Manufacturers").

³⁴³ Tsukamoto (Mitsubishi) Deposition) p. 35:20–37:20.

plant in Mexico operated by a North American subsidiary to manufacture CDTs and computer monitors.³⁴⁵ Mitsubishi initially manufactured solely shadow mask tubes until it licensed Sony's "aperture grille" technology in 1993.³⁴⁶ By 1998, Mitsubishi only produced aperture grille CDT tubes.³⁴⁷ Mitsubishi's CDT production was initially for its own computer monitors³⁴⁸ and, beginning in 2000, for NEC-Mitsubishi Electric Visual Systems Corporation (NMV), a 50-50 joint venture with NEC Corporation.³⁴⁹ Mitsubishi also sold CDTs to other CRT computer monitor manufacturers.³⁵⁰ Mitsubishi ceased production of CDTs in Mexico in 2003³⁵¹ and in Japan in 2004.³⁵² NEC bought out Mitsubishi's share of the NMV joint venture in 2005.³⁵³

- (128) Figure 11 through Figure 13 compare the weighted median prices for 17", 19", and 21" CDTs sold by Mitsubishi and its Co-conspirators. These figures indicate that Mitsubishi's prices followed a similar pattern and were generally higher than those of its Co-conspirators for similar products during the Class Period.

³⁴⁴ Mitsubishi Electric Corporation's Supplemental Response to Direct Action Plaintiffs' First Set of Interrogatories, No. 12 (Sept. 5, 2014) ("Mitsubishi Electric asserts that as of 1995, CDTs and CPTs were manufactured in Mitsubishi Electric's factory CRT Works, televisions were manufactured in Mitsubishi Electric's factory Kyoto Works, and monitors were manufactured in Nagasaki").

³⁴⁵ ME00131283 (Exhibit 8220).

³⁴⁶ Hideo Innami (Mitsubishi) Deposition 180:18–20 ("It was in 1993 -- 1993 that the aperture grille for display monitors was introduced. So until then it was all shadow mask."); *see also* Mitsubishi Electric Corporation's Supplemental Response to Direct Purchaser Plaintiffs' First Set of Interrogatories, No. 7 (Jan. 16, 2015) ("Mitsubishi Electric further asserts as of March 1, 1995, Mitsubishi Electric was licensing aperture grill technology for CDTs from Sony Corp. Mitsubishi Electric continued to license the aperture grill technology during, but not throughout, the Relevant Period.").

³⁴⁷ Hideo Innami (Mitsubishi) Deposition 180:21–181:1 (proportion of Mitsubishi's production of CDTs that was shadow mask as of December 1998 was "[z]ero").

³⁴⁸ Mitsubishi Electric Corporation's Supplemental Response to Direct Action Plaintiffs' First Set of Interrogatories, No. 4 (Sept. 5, 2014) ("During the alleged conspiracy period, Mitsubishi Electric sold CRTs to other Mitsubishi Electric subsidiaries and to other CRT Product Manufacturers").

³⁴⁹ Mitsubishi Electric Corporation's Supplemental Response to Direct Purchaser Plaintiffs' First Set of Interrogatories, No. 7 (Jan. 16, 2015) ("Mitsubishi Electric entered into a 50-50 joint venture for the manufacture of computer monitors with NEC called NEC-Mitsubishi Electric Visual Systems Corporation (NMV) in January 2000"); Tsukamoto (Mitsubishi) Deposition, p. 54:20–55:8, 56:3–9.

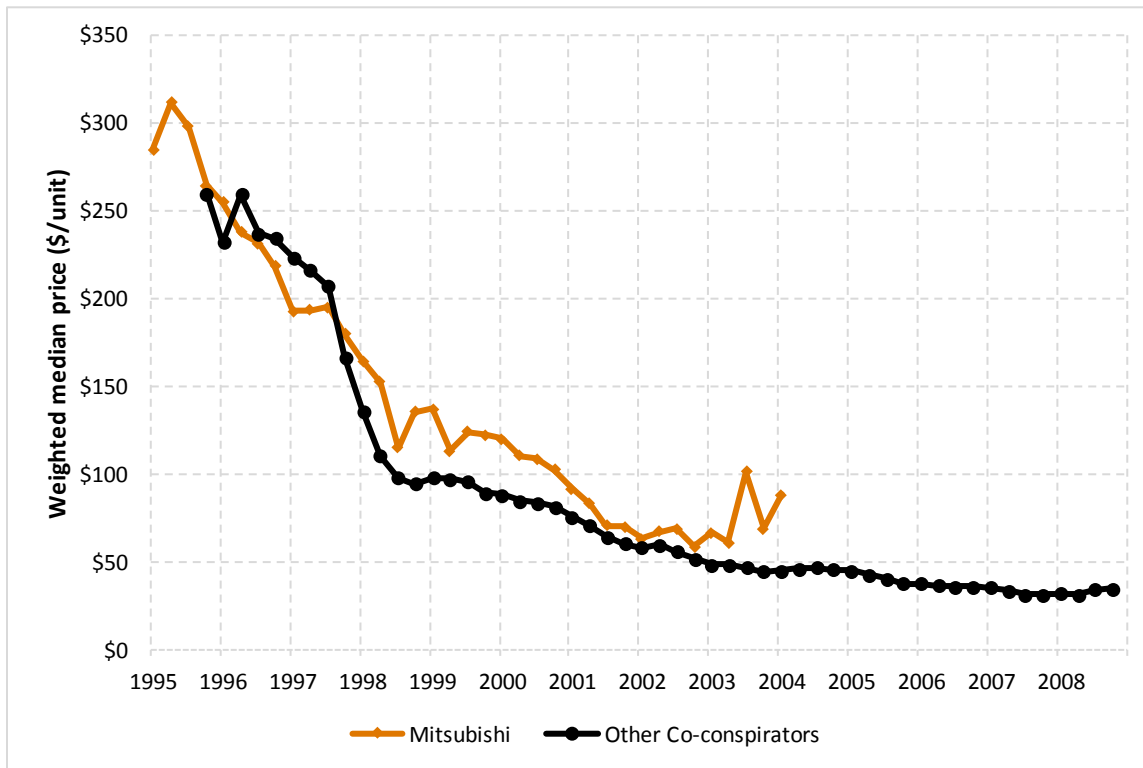
³⁵⁰ Mitsubishi Electric Defendants' Supplemental Responses and Objections to Direct Purchaser Plaintiff Studio Spectrum, Inc.'s First Set of Interrogatories, No. 5 (May 27, 2016) ("Mitsubishi Electric was the lone CRT manufacturer to make and sell aperture grille CDTs to other manufacturers of computer monitors").

³⁵¹ Mitsubishi Electric Defendants' Supplemental Responses and Objections to Direct Purchaser Plaintiff Studio Spectrum, Inc.'s First Set of Interrogatories, No. 5 (May 27, 2016) ("Mitsubishi Electric had continued to manufacture CDTs at a plant in Mexico for sale to purchasers including NMV, but by 2003 as liquid crystal display or 'LCD' technology was beginning to eclipse the CRT market, Mitsubishi Electric had begun to pull out, and in 2003 it announced the shutdown of its Mexico plant, as indicated by contemporaneous press reports").

³⁵² ME00011705 at 775 ("[s]ince MELCO will stop production of CRT at the end of 2004").

³⁵³ Tsukamoto (Mitsubishi) Deposition, 55:22–56:2.

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Figure 11: Comparison of 17" CDT ITC prices—Mitsubishi vs. Co-conspirators

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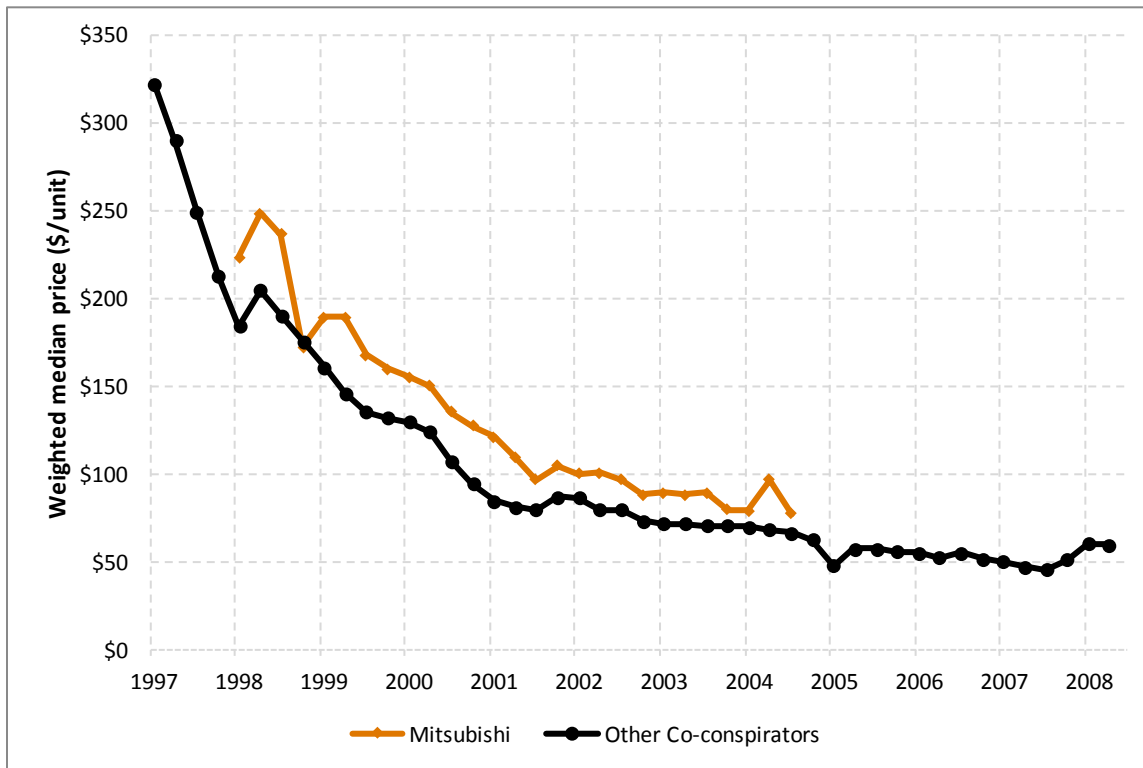
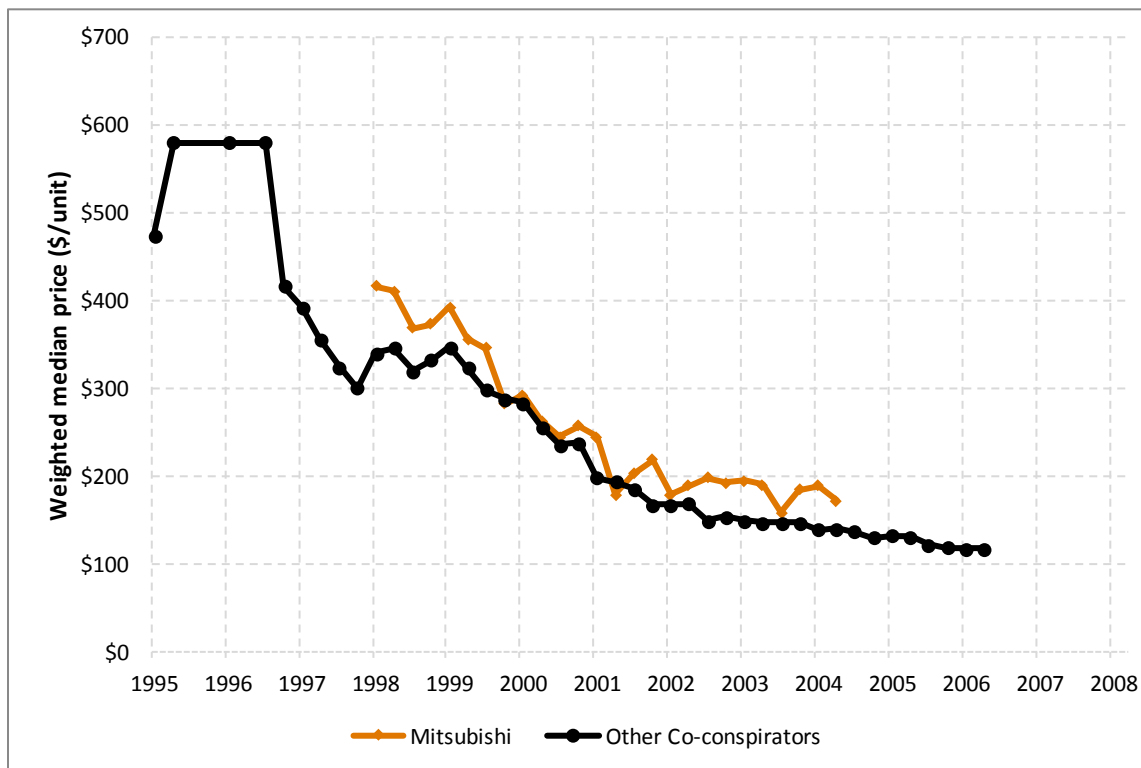
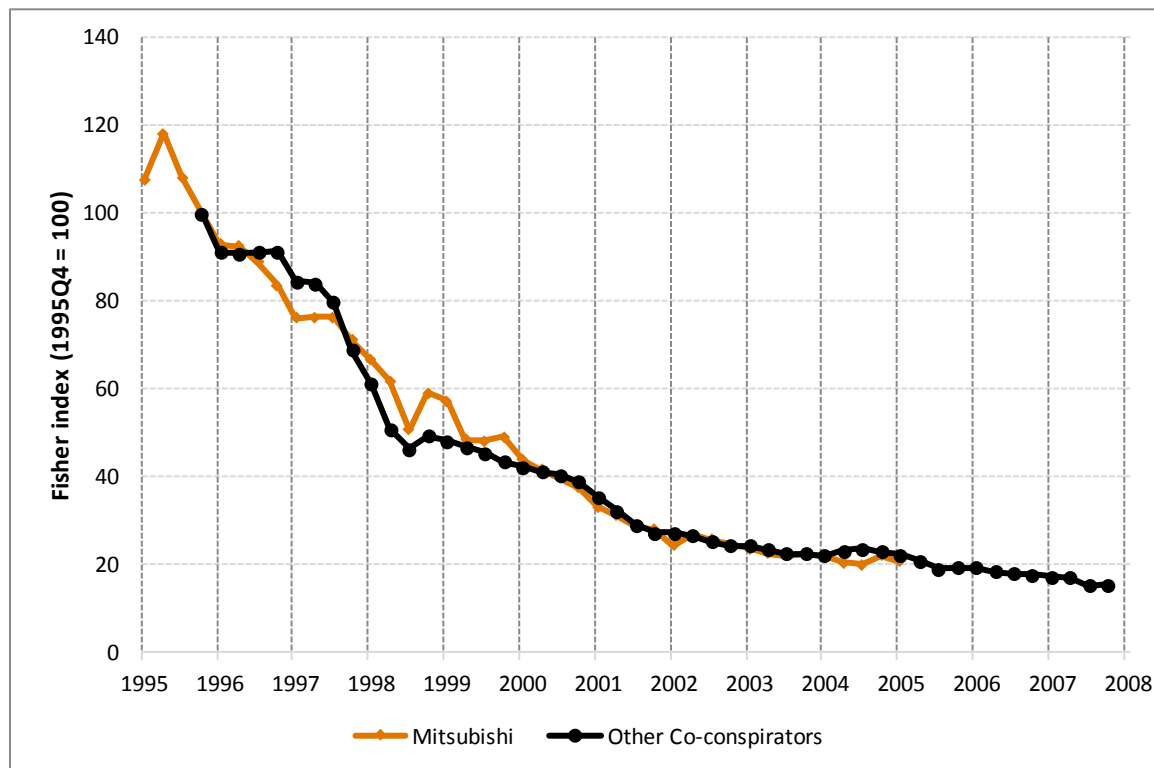
Figure 12: Comparison of 19" CDT ITC prices—Mitsubishi vs. Co-conspirators

Figure 13: Comparison of 21" CDT ITC prices—Mitsubishi vs. Co-conspirators

- (129) Figure 14 below compares prices for 17", 19", 20", and 21" CDTs sold by Mitsubishi and the other Co-conspirators using a Fisher price index, also known as an ideal price index.³⁵⁴ These four CDT sizes comprise more than 98% of Mitsubishi's CDT sales during the Class period. The comparison between the broader basket of products shows that Mitsubishi's pricing patterns are similar to those of the other Co-conspirators.³⁵⁵

³⁵⁴ A Fisher price index uses the geometric average of the change in the cost of two bundles: the bundle purchased in the first of the two consecutive periods, and the bundle purchased in the second of those periods. A chained price index computes the value of the index at any point in time by establishing a base period (for which the index is set to one) and appropriately combining the changes in the index between all intervening pairs of consecutive dates. Chained Fisher price indices are generally accepted and widely employed by economists; the Personal Consumption Expenditures index published by the U.S. Department of Commerce is one well-known example. *See, e.g.,* http://www.bea.gov/faq/index.cfm?faq_id=521.

³⁵⁵ The correlation between Mitsubishi's prices and its Co-conspirators' prices is 0.986, very close to a perfect correlation, and is statistically significant at the 1% level. Economists commonly analyze prices to determine whether they move together, and these types of studies have been performed in many different industries and for many different applications. The correlation between two variables is probably the most widely used statistical measure of the extent to which the variables move together.

Figure 14: Comparison of CDT prices—Mitsubishi vs. Co-conspirators

VI.B. Overview of Mitsubishi's conduct

- (130) The evidence in the record has multiple examples of conduct consistent with Mitsubishi's participation in the CRT cartel and inconsistent with its unilateral self-interest. At a high level, Mitsubishi Electric identified at least 35 meetings and communications with members of the CRT cartel as part of its interrogatory responses,³⁵⁶ and interrogatory responses from Samsung SDI confirm that "at least one Mitsubishi entity...participated in the CDT conspiracy described in SDI's Plea Agreement."³⁵⁷
- (131) As an economist, however, it is more than the fact that these meetings/communications took place that informs my opinion. I considered the nature of the information communicated and discussed during those interactions. For example, Mitsubishi's travel records reflect a business trip to Korea from October 8–10, 2002, by Hitoshi Nakajima to meet with "Samsung Electron Devices" (another

³⁵⁶ Updated Exhibit B to Mitsubishi Electric Corporation's Supplemental Response to DAPs' First Set of Interrogatories.

³⁵⁷ See Samsung SDI's Responses to Dell's First Set of Interrogatories at 14.

Mr. Jae In Lee of Samsung SDI also testified to meeting with Mitsubishi to discuss "topics within the CRT industry" "a little more than with the other Japanese companies" (including at least Toshiba, Hitachi, and perhaps Panasonic/Matsushita). See Jae In Lee (Samsung SDI) Deposition (2013) at 60-61.

name for Samsung SDI) and LG Philips regarding a “CRT Business Discussion. *Meeting on countermeasures for major PC makers*” (emphasis added).³⁵⁸ If there were a pro-competitive reason for a meeting between two purported competitors, the discussion would likely not center around “countermeasures” to take against a group of Samsung SDI, LG Philips, and Mitsubishi’s largest customers.

- (132) As outlined below, Mitsubishi exchanged competitively sensitive information on price, cost, production, and capacity, including then-current levels and future plans, with members of the CRT cartel, including at least Chunghwa, Hitachi, LPD, and Samsung SDI. Sharing such sensitive information is generally not in a firm’s unilateral self-interest. Evidence indicating that Mitsubishi shared its competitively sensitive information (e.g., prices for specific customers and products) with other firms supports the conclusion that Mitsubishi engaged in conduct contrary to its unilateral self-interest. In addition, evidence showing that others shared their competitively sensitive information with Mitsubishi supports the conclusion that Mitsubishi was a participant in the CRT cartel. It would not be in the unilateral self-interest of the other Co-conspirators to share this information with Mitsubishi. Sharing that information indicates an expectation that the information would be used in their joint interest. In the absence of an understanding that such information would be used to coordinate collusion, firms would be expected to keep such information close because sharing that information puts rivals in a position of being able to target each other’s customers for special deals. The information Mitsubishi exchanged with the other members of the CRT cartel is described in more detail below.

VI.B.1. Mitsubishi’s exchange of pricing information

- (133) There are many examples in the record of meetings for which the surviving documents reflect that Mitsubishi (1) shared its competitively sensitive pricing information with members of the CRT cartel or (2) was provided with competitively sensitive pricing information from CRT cartel members. This includes exchanging information on prices to customers of Mitsubishi and other Co-conspirators and meetings at which Mitsubishi wanted “to get SDI’s opinion” on prices charged to a particular customer. These communications include the following:³⁵⁹

1. Jae In Lee of Samsung SDI reported on his March 3, 2003, meeting with two representatives of Mitsubishi (Mr. Nakajima and Mr. Kato of Mitsubishi agent Koshida).³⁶⁰ Samsung SDI identified

³⁵⁸ ME00088467E (Exhibit 8203).

³⁵⁹ In addition to those discussed below, *see* CHU00028528-29 (Exhibit 8340), ME00088514E (Exhibit 6132), and entry on page 52 of Samsung SDI’s Second Supplemental Responses to Direct Plaintiffs’ First Set of Interrogatories, Nos. 4 and 5 “10/25/2001: Discussion with J.I. Lee (SDI) and Mitsubishi re sales projections, pricing and price forecasts, production, LPD’s manufacturing operations”; SDCRT-0087430-32; PHLP-CRT-015923-25 (Exhibit 2285) and ME00088160 (Exhibit 6114); SDCRT-0087970-76 (from SDCRT-0087790-8013); ME00131622 (Exhibit 6113); and CHU00028551-54 (Exhibit 8354).

³⁶⁰ Jae In Lee testified that he was a “regular attendee” of the glass meetings. *See* Jae In Lee (Samsung SDI) Deposition

this as one of the meetings at which it met with another CDT supplier to “fix the prices, reduce output, and allocate market shares” for CDTs.³⁶¹ The report indicates that two of the “purpose[s] of the visit” were “CDT price maintenance” and “[t]o get SDI’s opinion prior to price negotiations with Samsung Electronics.” The meeting also appears to have included a discussion of specific prices that Mitsubishi was charging Samsung SEC (a customer of both SDI and Mitsubishi):

- “Current price for Mitsubishi 22” Uni Pitch model is \$200-210, selling about 1K/month to SEC. However, with the development of ‘Variable Pitch,’ will be able to reduce price down to \$180 which is the same price as SDI, and requests SEC to transfer the 11K/month (FST 8K, DF 3K) volume which SDI is currently supplying to SEC to Mitsubishi’s NF type.”³⁶²
2. Mr. Seki of Mitsubishi met with “Assistant GM Lee and Mr. Ha” of Samsung SDI on March 31, 2004, and discussed specific “price increases” on 17” and 19” CRTs. The meeting notes state that:
- “[Price increase announcements] to customers were completed as of last week. Prices for 17” and 19” will be increased by \$2–\$3” (noting that “the reason given was the shortage of glass”).
 - “The price for 21” will not increase.”
 - “[N]egotiations are currently going well.”
 - “Eno has been contacted and confirmation has been made” after “newspapers in Taiwan reported that Chunghwa will raise prices.”
 - Samsung SDI will “make announcements to Korean newspapers today or tomorrow” regarding the price increase.³⁶³
3. Mr. Seki met with “Section Managers” Kim and Oh of LPD on the same day as his meeting with Samsung SDI (March 31, 2004). One of the topics at the meeting was “price increases”:
- “An official document requesting 10% price increases beginning in April were sent to all customers yesterday.”
 - “It appears that both SDI and Chunghwa have taken this [price increase announcement] in stride” and that at least one customer (AOC) “will accept the price increase.”

(2013) at 21-37 and Tsukamoto (Mitsubishi) Deposition) at 163-65.

³⁶¹ Samsung SDI’s Second Supplemental Responses to Direct Purchaser Plaintiffs’ First Set of Interrogatories, Nos. 4 and 5, p. 10 (listing SDCRT-0006041-6042 as a document “reflecting or pertaining to these discussions, meetings or agreements).

³⁶² SDCRT-0006041E-2E (Exhibit 635EF).

³⁶³ ME00131622E.

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The notes also include detailed information on LPD's CRT prices prior to the price increase: "17" flat: \$49–\$50, FST \$43–\$44, 19" flat: \$72–\$73, FST \$63–\$64."³⁶⁴

4. Mr. Nakajima of Mitsubishi reported on a June 15, 2001, meeting in which he "exchanged information with Vice-President Kim and Managing Director Kim of Samsung Electron Devices [SDI]."³⁶⁵ This included information Samsung SDI provided on its current and future prices (prices in "June of this year" and prices four and seven months into the future). Samsung also provided data on its costs for CRTs: "As a result, I learnt that Samsung is prepared for the prices from October of [2001, four months out] for 17" to be 72 dollars with a cost of 57 dollars and then from January of 2002 [seven months in the future], a price of 68 dollars. In June of this year, the sales price was between 75 and 78 dollars, while the cost was 54 dollars and material cost was 38 dollars."³⁶⁶ Mitsubishi Electric's 30(b)(6) witness confirmed that Samsung SDI was sharing future pricing information and cost in this meeting.³⁶⁷

Based on my review of the Co-conspirators' sales data, Mitsubishi purchased less than \$100,000 of 17" CDT tubes from any of its co-conspirators during the Class Period, all from Toshiba. Mitsubishi did not purchase any CDTs from Samsung SDI. Thus, it does not appear that Samsung SDI shared this information on future pricing and costs with Mitsubishi for the purpose of obtaining additional sales to Mitsubishi.

On June 22, 2001 (i.e., one week after this meeting between Samsung SDI and Mitsubishi), Samsung SDI appears to have met with Hitachi. An email documenting the meeting suggests that Samsung SDI provided Hitachi with Samsung SDI's own production information, detailed inventory data by manufacturer for Chunghwa, Samsung SDI, Orion, and LG, and pricing and cost information for Mitsubishi for 17" flat CDTs.³⁶⁸ Note that Mr. Nakajima's report included SDI's price and cost data for 17" CDTs.

³⁶⁴ ME00131622E.

³⁶⁵ ME00088545E. According to a Mitsubishi Overseas Business Trip Request, Hitoshi Nakajima traveled to Seoul from June 14-16, 2001 for "CRT, LCD VP matter; <Meeting with the top executives of Samsung Electronics, Samsung Electron Devices [SDI]>." See ME 00088494E (Exhibit 8202E).

³⁶⁶ ME00088545E.

³⁶⁷ See Tsukamoto (Mitsubishi) Deposition), at 197:1-16.

Q. Okay. But there was a discussion that the price SDI would be charging in January of 2002 is \$68, correct?

A. Yeah, I understand that it talks about that.

Q. And so in this case, SDI and Mitsubishi Electric Corporation were talking about future pricing; is that correct, sir?

A. I understand that the -- SDI's future pricing information was being shared.

Q. And SDI also shared that their costs was \$54, and material cost was \$38 for June of 2001, right?

A. Yes.

³⁶⁸ HDP-CRT00026180E-81E (Exhibit 1570-EF).

5. Mitsubishi shared its “current 17" x 0.28mm selling price and market price (USD250–270)” and for 17" x 0.25mm CRTs (“can reach USD320–30/pc”) with personnel from Chunghwa on December 4, 1995.³⁶⁹
6. Notes from a December 18, 1998, meeting where the “main topic” of the meeting was “Market Information/Opinion Exchange” between Mitsubishi and Chunghwa report that Mitsubishi told Chunghwa that “[t]he selling price of the 17" ND tube is *currently* about USD 120–121/pc. Flat Tubes +5%” (emphasis added).³⁷⁰
7. In notes from an August 2, 2001, meeting with Chunghwa (attended by Edward Cheng and Yvonne Yun of Chunghwa), Mitsubishi appears to have provided prices for specific CRTs (by size) and specific customers in Taiwan: “Price wise, 17" is approximately at US\$95-100, 19" approximately at US\$130–140, 22" approximately at US\$300 or so.”³⁷¹
8. Masahiko Konishi, a Mitsubishi Electric employee, summarized a meeting with two Samsung Japan “department managers” on August 9, 2001. The meeting notes reflect detailed discussions of 21" CDT prices as part of a “Market information exchange”: “For large quantity [SDI is] asking \$220 and for small quantity, \$240. Hitachi’s price was \$250 so customers are quite satisfied with this too.”³⁷² The summary email reflects information sharing about production cost information (“I asked if direct material cost is really 60% and the answer was ‘Yes’”) and reports that “[a] suggestion was made to exchange information *next time*” including “people involved in materials”³⁷³ (emphasis added). As I noted earlier, Samsung SDI’s sales data do not indicate any sales of CDTs to Mitsubishi, suggesting that Samsung SDI did not provide this information to generate purchases by (or sales to) Mitsubishi.³⁷⁴

A Hitachi email summarizing an “information exchange with Samsung Japan on August 29” contains data on Mitsubishi’s current and future prices that Samsung may have shared with Hitachi.³⁷⁵ The Mitsubishi prices for Q2, Q3, and Q4 are identical to the 17AG prices from Mitsubishi’s notes from its meeting with Samsung Japan 20 days earlier.³⁷⁶

9. One of Mitsubishi’s documents reflects a meeting between Mitsubishi employees Nakajima and Yamaguchi and Samsung “SDI Managing Director Kim and 4 others.” The meeting notes reflect

³⁶⁹ CHU00028558E (Exhibit 1111E). The notes themselves were taken by Chung-Yuan (Michael) Du, a Chunghwa employee that attended multiple glass meetings (see CHU00028730E-33E (Exhibit 1106E) and CHU00029191E-4E (Exhibit 1108EF)).

³⁷⁰ CHU00028532E-3E.

³⁷¹ CHU00031154 (Exhibit 8201).

³⁷² ME00025688E-9E.

³⁷³ ME00025688E-9E.

³⁷⁴ The Samsung SDI sales data do indicate that Mitsubishi purchased CPT tubes from Samsung (generally 25" and larger).

³⁷⁵ HDP-CRT00026189E – 91E (Exhibit 1571EF).

³⁷⁶ See ME00025688E-9E and HDP-CRT00026189E – 91E (Exhibit 1571EF).

an exchange of information on Samsung SDI's prices ("The June price of 21" DFs for *outside customers* is \$175") (emphasis added), SDI's cost structure ("With this price as a base, profit is 20%"), and Samsung's future price planning ("Since it is sufficient to maintain 21" at a volume of 300,000 units, there will be no aggressive cut in price for them. Cost reduction for 17" is more important than for 21").³⁷⁷ The document also reflects Mitsubishi's importance to the success of the price "maintenance," at least per the Co-conspirators: "Maintenance of the 21" price depends on prices for 19" LCDs and Mitsubishi CRTs."³⁷⁸

10. Mitsubishi's notes reflect a meeting with "LPD Managing Director Yang and 2 others" at which LPD shared its prices with Mitsubishi: "June prices are \$54 for 17" flat and \$80 for 19" flat."³⁷⁹ Based on my review of the Co-conspirators' sales data, Mitsubishi did not purchase 17" or 19" CRTs from LPD.

VI.B.2. Mitsubishi's exchange of production/capacity information

- (134) There are also multiple examples of Mitsubishi and the other CRT cartel members exchanging information on production levels, future production plans, and other strategically sensitive information. Some of these exchanges took place at the same meetings noted above, where price and cost information was exchanged, but the documents also reflect discussions focused on production issues.³⁸⁰
 1. Chunghwa's notes from a March 6, 2000, meeting with Mitsubishi reflect that Mitsubishi provided detailed production plans by plant and year to Chunghwa for 1999 (historical levels), 2000, and 2001. The notes also reflect Mitsubishi sharing its pricing data for 17" CPTs with a note that "[h]opefully Chunghwa Picture Tubes can sell high" in response to "production process issues" that Samsung SDI is having.³⁸¹ Chunghwa's notes also reflect that "Mr. Nakajima [of Mitsubishi] will facilitate the introduction of Chunghwa Picture Tubes' products, such as the 17" RF tube" with NPG, a purchaser of CRTs currently buying from "TSB, SDI, and LG."³⁸² Mitsubishi's records reflect travel by Mr. Nakajima to Taiwan on March 5-6, 2000.³⁸³

³⁷⁷ ME00131622E (Exhibit 6113E).

³⁷⁸ ME00131622E (Exhibit 6113E).

³⁷⁹ ME00131622E (Exhibit 6113E). Hitoshi Tsukamoto, 30(b)(6) witness for Mitsubishi confirmed in his deposition that "...discussions about pricing took place." See Tsukamoto (Mitsubishi) Deposition), at 245-46.

³⁸⁰ For examples in addition to those described in more detail below, see SDCRT0006041-42 (Exhibit 635EF), ME00131622 (Exhibit 6113), HDP-CRT00025601-02 (Exhibit 8353), and HDP-CRT00025584 (Exhibit 2377).

³⁸¹ CHU00028528E (Exhibit 8340E).

³⁸² CHU00028528E (Exhibit 8340E).

³⁸³ ME00088514E.

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2. Chunghwa's notes from a December 4, 1995, meeting with Mitsubishi reflect detailed information that Mitsubishi disclosed to Chunghwa regarding its future production and capacity plans:
 - "[Has] fully ceased production of 14"/15" CDT and is only producing 17"/21"" in Japan.
 - "March '96 will have one new line (17" 0.25 mm) added to production, initial outputs about 30k/M. Full production capacity is 100k/M, At that time, its 0.25mm total output can reach 150k/M, Adding the original 80k/M(0.28 mm), 17" total production volume can reach 230k/M. ('96/3Q), additionally, 21" will reach an output of 50k/M by '96/3Q."³⁸⁴
3. Chunghwa's notes from a December 18, 1998, meeting with Mitsubishi where the "Main Topic" was "Market Information/Opinion Exchange" indicate that Mitsubishi disclosed to Chunghwa its "current" "production line deployment" for 1999 and "tentative" planning by production line for 2000. This included information about Mitsubishi's "tactics" looking forward, its current selling prices, and targets for cost reductions.³⁸⁵ As Hideo Innami of Mitsubishi testified, Chunghwa was not a customer of Mitsubishi.³⁸⁶
4. Mr. Konishi of Mitsubishi wrote to "senior staff" at Hitachi on February 2, 1999, to understand details about Hitachi's production of 21" CRTs. He writes: "I would like to get you to let me know it within the range allowable, but how has the production ratio of your company's 21 inch, 0.28 mm and 0.26 mm turned out to be? For your reference, for our company's 0.28:0.26:0.25-27 (flat), it is about 8:1:1, but in the future the plan is 0:0:10."³⁸⁷
5. Mitsubishi met with LPD in August 2004 in Hong Kong for a "market discussion" at which Mitsubishi provided LPD with information on average selling prices for 21" SMF CRTs (\$150) and 22" AG CRTs (over \$200), Mitsubishi's capacity and "loading rate," timing for its planned shutdown of a production line in Kyoto, and plans by NMV to potentially stop making CRT monitors in 2005 ("but not confirmed").³⁸⁸ Mitsubishi's travel records confirm the meeting with

³⁸⁴ CHU00028558E (Exhibit 1111E).

³⁸⁵ CHU00028532E-3E.

³⁸⁶ Hideo Innami (Mitsubishi) Deposition at 166:

Q And the -- another purpose listed is visits to customers?

A I stopped over in Taiwan on my return from Thailand. I visited current customers as well as 9 our so-called potential customers with whom we had hopes for a future prospective.

Q You list Chunghwa Picture Tubes as a customer. That's not correct, is it?

A That is -- that is not correct in that sense.

MAIN INTERPRETER: Interpreter correction: "You're right. That is not correct in that sense."

³⁸⁷ HDP-CRT00023340-41 (Exhibit 8329).

³⁸⁸ PHLP-CRT-015923-25 (Exhibit 2285).

LPD and include a note that Mr. Nakanishi of Mitsubishi also met with J.I. Lee of Samsung SDI in Korea in the days prior to the LPD meeting.³⁸⁹

6. Mitsubishi's notes from a "market information exchange" meeting with Samsung on August 9, 2001, reflect future production information for Samsung and Mitsubishi for the third and fourth quarters of 2001 (current and subsequent quarters) by specific CRT model (17SM, 17SMF, 17AG, 19SM, 19SMF, and 19AG).³⁹⁰
7. Chunghwa's notes reflect a meeting between Chunghwa's "Sales and Marketing Division" and the GM of Mitsubishi's CRT Business Division, Mr. Ishii on November 21, 1996. The notes reflect the following as the "purpose of visit": "It was [Mr. Ishii's] first visit to CPTM [Chunghwa]. Besides asking to visit the plant, he also exchanged information about production situation as well as future plans etc. with our M.D. and Mr. Fang [the President of CPTM]."³⁹¹ During the visit, Mitsubishi provided Chunghwa with detailed information on its production lines at its Kyoto plant, including annual output, production technology, and production forecasts for 1997.

VI.B.3. Other Mitsubishi meetings with limited documentation

- (135) In addition to the meetings documented above, there are other meetings between Mitsubishi and other CRT Co-conspirators for which less detail is available. For some meetings there is some detail available, whereas others have been identified in responses to interrogatories. These meetings, presented chronologically, include:
 - (136) March 15, 1999: The KFTC decision reports the following on a multi-party meeting:
 - "The defendants confirmed a fact that transferred to Hitachi and Mitsubishi through Philips as previously agreed and requested a support because the cooperation of Japanese companies is necessary condition with relevance to the price increase of 17" on May the same year."³⁹²
 - "Mr. Ha of SDD said that if the price increase cannot succeed to get a support from Japanese manufacturers it would not succeed. Mr. Lin answered that Mr. David Chang disclosed the agreement of Malaysia to HTC/MEC and requested support."³⁹³
 - (137) August 12–14, 1999: Mitsubishi's travel records reflect a business trip to Seoul and Busan, Korea by Hitoshi Nakajima for a meeting on 15"-17" monitors and "*regarding CRT 17" and 19" prices*"³⁹⁴ (emphasis added). No company names are provided.

³⁸⁹ ME00088160-1 – 60-2 (Exhibit 6114).

³⁹⁰ ME00025688E-9E.

³⁹¹ CHU00028548.01E – 50E.

³⁹² KFTC Decision at ¶129.

³⁹³ KFTC Decision at ¶129.

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- (138) August 29, 2000: “Meeting in Japan with Mr. Jae In Lee, Mr. Michael Son (SDI); and Mr. [Hitoshi] Nakajima, Mr. Katsuno Tsujiyama (Mitsubishi) re business organization; LCD market, and capacity of Mitsubishi’s factory in Mexico.”³⁹⁵ As noted earlier, Jae In Lee was an attendee of glass meetings on behalf of Samsung SDI.
- (139) September 6–8, 2000: Mitsubishi’s travel records reflect a business trip to Busan, Korea (LG Electronics), and elsewhere in Korea (Samsung Electron Devices (SDI) and Samsung Electronics) by Hitoshi Nakajima for a meeting on “the CRT matter.”³⁹⁶
- (140) December 7–9, 2000: Mitsubishi’s travel records reflect a business trip to Taiwan by Hitoshi Nakajima to meet with Chunghwa Picture Tubes regarding “the CRT matter.”³⁹⁷
- (141) October 25, 2001: Discussion with J.I. Lee of Samsung SDI to discuss “sales projections, prices and price forecasts, production, LPD’s manufacturing operations.” Mitsubishi’s travel records reflect a business trip to Korea by Hitoshi Nakajima to meet with Samsung SDI regarding “the CRT matter.”³⁹⁸
- (142) July 2–3, 2002: Mitsubishi’s travel records reflect a business trip to Korea by Kunhiko Seki for a meeting with Samsung Electron Tubes [i.e., Samsung SDI].³⁹⁹
- (143) July 1, 2004: “Information exchange in Korea with Mr. Jae In Lee (SDI), Mr. Nakanishi, and Mitsubishi re sales status and CRT supply and demand forecasts.”⁴⁰⁰

VI.B.4. Information sharing among Mitsubishi and other Japanese producers through the EIAJ

- (144) In addition to sharing competitively sensitive information with other, primarily non-Japanese CRT producers, Mitsubishi also shared detailed information with Japanese CRT producers through the Electronic Industries Association of Japan (EIAJ), a Japanese trade association, in at least 1998 and 1999. Through the EIAJ, the Japanese CRT manufacturers shared “statistics (by manufacturer and

³⁹⁴ ME 00088527E.

³⁹⁵ Samsung SDI’s Second Supplemental Responses to Direct Purchaser Plaintiffs’ First Set of Interrogatories, Nos. 4 and 5, p. 42.

³⁹⁶ ME00088502E (Exhibit 6133E).

³⁹⁷ ME00088500E (Exhibit 6143E).

³⁹⁸ Samsung SDI’s Second Supplemental Responses to Direct Purchaser Plaintiffs’ First Set of Interrogatories, Nos. 4 and 5, p. 52; Jae In Lee (Samsung SDI) Deposition (2013) at 61-62. *See also* ME00088485 (Exhibit 6124E) and SDCRT-0087430-32E.

³⁹⁹ ME00088258E (Exhibit 6136E) and Deposition of Kunihiko Seki (Mitsubishi), February 24-25, 2015, pp. 111-113.

⁴⁰⁰ Samsung SDI’s Second Supplemental Responses to Direct Purchaser Plaintiffs’ First Set of Interrogatories, Nos. 4 and 5, p. 72.

model number) of the electronic tube/cathode ray tube” industry “over many years of cooperation.”⁴⁰¹ While sharing certain types of information through trade associations is not necessarily anti-competitive, of particular relevance here is that the EIAJ “was instructed” that the information being exchanged among its members was “*extremely unfavorable* in consideration of the Antitrust Law for industry organizations from both inside and outside of the EIAJ, and it has been decided, as a result of deliberations by the related companies, to discontinue the practice as of the August results” (emphasis added).⁴⁰² The EIAJ sought input from its members for “new statistics” that would be reported “after the above statistics have been cancelled,” including a proposed template.⁴⁰³

- (145) While the EIAJ worked on an alternative way to collect and share information that would be helpful to the CRT manufacturers and not “extremely unfavorable” in light of the antitrust laws, the individual CRT manufacturers continued to share the information among themselves. Moreover, they continued to exchange detailed, company-specific information without informing the EIAJ.⁴⁰⁴
- (146) An example of the difference in the level of detail is available by comparing HDP-CRT00023231-33 (Exhibit 8334) and HDP-CRT00024145-47 (Exhibit 8335). Exhibit 8335 is an email from the auditing firm circulating the “results compiled for the March portion of the CRT statistics that we have had submitted” and lists total CRT production by size and type aggregated across producers.⁴⁰⁵ In contrast, Exhibit 8334 reports the same information individually by company, although the companies are encoded and reported as letters A–F.⁴⁰⁶
- (147) For an economist, the difference in the level of aggregation is telling. Obtaining aggregate industry statistics on sales of and demand for particular products can help a business optimize the mix of products its wants to sell to maximize its profits and can be pro-competitive. Knowing which individual companies are making which products is a level of detail that the EIAJ made clear was “*extremely unfavorable* in consideration of the Antitrust Law.” The information exchanged here, in light of the guidance from the EIAJ, is consistent with the pattern of exchanging competitively sensitive information among the members of the CRT cartel.

⁴⁰¹ ME00109690-94 (Exhibit 6111E).

⁴⁰² ME00109690-94 (Exhibit 6111E).

⁴⁰³ ME00109690-94 (Exhibit 6111E).

⁴⁰⁴ ME00109911 (Exhibit 6112E).

⁴⁰⁵ HDP-CRT00024145-47 (Exhibit 8335).

⁴⁰⁶ HDP-CRT00023231-33 (Exhibit 8334). *See* HDP-CRT00023360 (Exhibit 1581EF) in which Panasonic decoded the company abbreviations.

For additional information regarding information exchanges among the EIAJ, *see* HDP-CRT00004416-18 (Exhibit 1582); HDP-CRT00023222-24 (Exhibit 6123); HDP-CRT00023225-27 (Exhibit 8337); HDP-CRT00023228-29 (Exhibit 8336); HDP-CRT00023234-37 (Exhibit 8332); HDP-CRT00023238-44 (Exhibit 8331); HDP-CRT00023353-55 (Exhibit 8087); HDP-CRT00023363-65 (Exhibit 8085); HDP-CRT00024145-47 (Exhibit 8335); HDP-CRT00026401-02; HDP-CRT00055836-41 (Exhibit 8218); ME00109779-81 (Exhibit 8091); ME00109895-98 (Exhibit 8086); ME00109966 (Exhibit 6121); ME00110106-07 (Exhibit 8327).

VI.B.5. Summary

- (148) The evidence discussed above includes examples in which Mitsubishi is exchanging price, quantity, production, and other strategic information with CRT cartel member firms (including individuals who attended the glass meetings). Sharing this information is not in Mitsubishi's unilateral self-interest. In several of the examples outlined above, Mitsubishi provided detailed price information to Chunghwa and Samsung SDI, which did not manufacture CRT products or purchase CRTs from Mitsubishi during the Class Period. In several more of the examples regarding production data outlined above, Mitsubishi provided detailed information on its production levels and plans to Chunghwa. In other cases, the evidence contains examples where Mitsubishi was provided with competitively sensitive information from CRT cartel members. As I discussed in Section III.D above, the DOJ/FTC Guidelines recognize that "...the sharing of information relating to price, output, costs, or strategic planning is more likely to raise competitive concern than the sharing of information relating to less competitively sensitive variables."⁴⁰⁷ Moreover, there is evidence of these meetings and information exchanges in each year from 1995 through 2004 except 1997.⁴⁰⁸ This behavior by Mitsubishi is consistent with its participation in the CRT cartel and inconsistent with its unilateral self-interest.
- (149) There can be pro-competitive justifications for competitors in an industry sharing certain kinds of information with one another. As I state in my book, "As examples, communication related to patent licensing, arranging product swaps, or organizing lobbying efforts may serve a dual purpose, potentially providing consumer benefits as well as potentially supporting collusion."⁴⁰⁹ In addition, discussions related to standard setting may improve efficiency—for example, coordination by lightbulb manufacturers on the size and direction of threading on lightbulbs would have the benefits of allowing lightbulbs to be interchangeable, enhancing the value of the product to consumers.
- (150) Certain kinds of information sharing through the use of a trade association can also have efficiency benefits. I note in my book that firms have an interest in estimating market-wide demand conditions and that there might be efficiencies from having a trade association perform this task and communicate it to the firms rather than each firm doing it alone.⁴¹⁰ A trade association can also provide benefits because "each firm may see a benefit to influencing legislation or regulations, but because each firm would only get its market share of the benefit from any influence costs it incurred, each firm underinvests in the activity relative to a trade association, which acts on behalf of all industry members and so accounts for the full industrywide benefit in its influence activities."⁴¹¹ This

⁴⁰⁷ Guidelines at §3.31(b).

⁴⁰⁸ There are documents reflecting a meeting between Mitsubishi and David Chang, the Philips employee credited in part with the structure of the glass meetings, in June 1997. See ME00024873-89 (Exhibit 8214).

⁴⁰⁹ Marshall and Marx, *Economics of Collusion*, p. 6. See also Reply Expert Report of Prof. Dennis W. Carlton (Aug. 5, 2014) in the Dell plaintiffs case regarding CRTs (3:13-cv-02171-SC) at 42-43 and the Expert Report of Dov Rothman, PhD (Aug. 5, 2014) in this matter (multiple cases) at 12-14.

⁴¹⁰ Marshall and Marx, *Economics of Collusion*, p. 133.

⁴¹¹ Marshall and Marx, *Economics of Collusion*, p. 133

type of argument applies also to industrywide advertising (the “Got Milk” campaign initiated by the California Milk Processor Board is one example).

- (151) Although possible pro-competitive explanations exist for certain kinds of information sharing, the information sharing reflected in the evidence that I have reviewed and that I describe in this report does not fit in any of these categories. The information sharing was not designed to enhance demand for CRTs or CRT products. It was not designed to influence legislation or regulations. It does not reflect efforts to coordinate on standards that would enhance value to consumers. In short, the information sharing among Co-conspirators that I describe in this report has no credible pro-competitive explanation. However, it does fit exactly into the types of information sharing that the economics literature describes as pro-collusive, particularly insofar as it supports the pricing, allocation, and monitoring and enforcement structures that allow a cartel to increase prices above what they otherwise would have been.
- (152) Although evidence of information sharing by itself would not allow me to conclude that the evidence is inconsistent with non-collusive conduct, the observation of the kinds of information sharing evident in this matter does because the information sharing at issue here cannot be explained as part of legitimate business conduct.⁴¹² Perhaps there are pro-competitive explanations for the observed information sharing outside the range of what the literature has suggested and that I am not creative enough to conceive of, but absent the Co-conspirators filling in what the literature has missed in terms of pro-competitive explanations for information sharing, I am left with the observation of conduct that has no pro-competitive explanation and that fits precisely the mold for pro-collusive information sharing. Taken in the context of admissions of a price fixing cartel, the only explanation that makes economic sense is that the information sharing was in support of a collusive agreement.
- (153) As I discussed in Section IV.B, the actions of the CRT cartel were not limited to the glass meetings. Thus, it is a fallacy to conclude that Mitsubishi did not participate in the CRT cartel simply because it did not attend the glass meetings. For example, notes from a November 25, 1996, meeting between Hitachi, Chunghwa, and Samsung SDI capture Hitachi’s reaction to an invitation to attend cartel meetings:

We invited MR. KIMURA to represent HEDS to participate in the next discussion with CRT factories. Mr. KIMURA’s face showed reluctance. Arranging this meeting with CPT and SDD exposes him to high risk. Therefore all three parties agreed that after each CRT factory meeting, Director Liu and Mr. Na would come to S’PORE to

⁴¹² According to the Co-conspirators’ sales data, Mitsubishi only purchased \$13.8 million in CDTs during the Class Period. In contrast, Mitsubishi sold more than \$3.8 billion in CDTs during the Class Period.

meet MR. KIMURA again and to explain to him the resolutions made at the meeting⁴¹³ (emphasis in original).

There are many examples of conversations and meetings between Co-conspirators, including those with Mitsubishi described above, where the discussion included increasing prices or reducing production.⁴¹⁴ The CRT Co-conspirators appear to have recognized the importance of involving CRT manufacturers that did not attend all of the glass meetings. First, some meeting notes specifically point to the importance of non-glass meeting attendees to the success of the price increase.⁴¹⁵ Second, the glass meeting “chairman” “designated” or “assigned” “certain people to...communicate to other companies [that] were not at the glass meetings.”⁴¹⁶ Third, information on non-attendees was

⁴¹³ See CHU00028396E-97E (Exhibit 1104E).

⁴¹⁴ CHU00028791-3 (Exhibit 1208EF) (November 1996 meeting between Samsung SDI, Chunghwa, and Orion). Chunghwa held a series of bilateral meetings with Toshiba, Panasonic, and Hitachi in April 1997 in addition to a group meeting with Samsung SDI, Orion, and Philips. See CHU00028283E-5E (Exhibit 1119E); CH00028503.01E-4E (Exhibit 1234EF) (“The main goal of this trip is to explain to MEC [Panasonic] staff the background of the current price rise of 14”/15” CDT and the current price of SDD/PH/ CPT/LG/ TSB, etc. in order to persuade MEC staff and to obtain their recognition so that they can support with actual price rise action, making this CDT price rise more satisfactorily”); CHU00028393.01E-3.02E (Exhibit 1121E); and CHU00028740.01E-3E (Exhibit 1120E). CHU00028393.01E-3.02E (Exhibit 1121E, 1015).

As another example, notes from a May 26, 2000, meeting with Samsung SDI, LG, Orion, Philips, and Chunghwa indicate that the attendees planned a price increase effective July 1, 2000. See CHU00031006.01E. On June 8, 2000 (roughly two weeks later), Chunghwa met with Panasonic to discuss, among other things, that “starting from July 1st, 14”/15”/17” CDT prices will be raised. [Panasonic] Vice Manager Hsu said MEC no longer has the ability to lead any price hike but would be glad to see its success and would definitely FLW [follow] price hike and the increase amount would also FLW, i.e., \$3-5.” See and CHU00028425E (Exhibit 2613E).

⁴¹⁵ See, e.g., ME00131622E and CH00028503.01E-4E (Exhibit 1234EF). The KFTC also noted the interaction between the glass meeting attendees and the Japanese (“The defendants found out that their plan to increase the prices was not going smoothly due to Hitachi’s failure to increase its sales prices as agreed. So, in April and May of the same year, the defendants notified the Japanese manufacturers about the agreements and agreed to persuade the Japanese manufacturers to carry out the agreements.”). See KFTC Decision at p. 34.

⁴¹⁶ C.C. Liu (Chunghwa) Deposition, pp. 81-93. See also CHU00029179E: August 1999 glass meeting with Chunghwa, Samsung SDI, LG, Orion, and Thai-CRT where meeting attendees were assigned to contact IRICO, BMCC, and Toshiba.

This is not the first cartel to have such a structure. For example, in the LCD cartel it appears certain companies attended the “Crystal Meetings” and certain Japanese suppliers received the information that was discussed at them.

- Transcript of Trial Testimony of Hong Bum Suh, Vol. 2, 299:5-8, *In Re: TFT-LCD (Flat Panel) Antitrust Litig.*, No. M07-1827 SI (N.D. Cal. May 21, 2012) (Suh testifying regarding information that was provided to him regarding the Crystal Meetings: “He said that in Taiwan, we will try our best through these kind of meetings to keep the price up, or keep the prices [from] falling down; that please convey this information to the Japanese competitors, so that they can follow suit.”);
- Transcript of Trial Testimony of Hong Bum Suh, Vol. 2, 301:24-302:1, *In Re: TFT-LCD (Flat Panel) Antitrust Litig.*, No. M 07-1827 SI (N.D. Cal. May 21, 2012) (“[W]e wish that the discussions that is happening in Taiwan be conveyed to the Japanese suppliers, so that they can also join the effort.”);
- Transcript of Trial Testimony of Hsueh-Lung Brian Lee, Vol. 10, 1401:10-11 *In Re: TFT-LCD (Flat Panel) Antitrust Litig.*, No. M 07-1827 SI (N.D. Cal. June 5, 2012) (Mr. Lee testifying that the Crystal Meeting participants wished to involve the Japanese competitors because in 2001, “the production volume of those Japanese makers was still making a big difference”);
- Transcript of Trial Testimony of Hsueh-Lung Brian Lee Concerning Trial Ex. 118, Vol. 10, 1406:9-11, *In Re: TFT-LCD (Flat Panel) Antitrust Litig.*, No. M 07-1827 SI (N.D. Cal. June 5, 2012) (“Regarding attendance by the Japanese, notify them of the results and encourage them to cooperate rather than having to attend the

discussed in the glass meetings.⁴¹⁷ This evidence supports the conclusion that Mitsubishi and its Co-conspirators' conduct was consistent with participation in a cartel and inconsistent with their unilateral self-interest.

VI.C. Mitsubishi had an incentive to collude

- (154) When investigating cartel behavior, economists often consider firms' incentives to participate in a cartel. For the reasons discussed below, Mitsubishi's participation in the cartel is consistent with its economic incentives.
- (155) All CRT manufacturers would benefit from the existence of a cartel and would benefit more as the cartel is more effective. By participating in the cartel, Mitsubishi was able to encourage its existence and its effectiveness. Mitsubishi sold products that competed with those of the other Co-conspirators during the Class Period, and therefore suppressing rivalry between Mitsubishi and its Co-conspirators was beneficial for all participants. This is true even to the extent that Mitsubishi's aperture grille-based CRTs are considered a differentiated product from shadow-mask based CRTs. The evidence suggests that Mitsubishi viewed its CRTs as being in competition with CRTs using shadow-mask technology and priced its product in reference to the shadow-mask versions.⁴¹⁸ For example:

conference.”);

- Transcript of Trial Testimony of Hsueh-Lung Brian Lee Concerning Trial Ex. 31, Vol. 10, 1408:25-1409:1, *In Re: TFT-LCD (Flat Panel) Antitrust Litig.*, No. M 07-1827 SI (N.D. Cal. June 5, 2012) (Mr. Lee testifying concerning an agenda item for the November 15, 2001 Crystal Meeting: “How to contact Japanese makers in the industry to synchronize the stabilization of price.”).

⁴¹⁷ See, e.g., SDCRT-0086557, notes from a meeting attended by at least Chunghwa, LG, Philips, and Samsung SDI include capacity, loading, and output figures for “Japan 17” production (*from Philips*)” (emphasis added). According to the KFTC decision, Philips had a role to “induce the participation of agreement by Japanese companies” (KFTC Decision at ¶ 127). For example, David Chang of Philips “disclosed the agreement of Malaysia to HTC/MEC [Mitsubishi] and requested support” (KFTC Decision at ¶ 129).

As the EC wrote in its decision, “The Japanese CDT makers seem to have found it difficult or even impossible to attend multilateral meetings due to antitrust concerns, but considered bilateral contacts to be more feasible. This is illustrated well in the minutes of a meeting held on 14 January 1998 where [party to the proceedings] proposed that each cartel member should station representatives in Korea, Japan and Taiwan to participate in meetings. [...] This is also confirmed by [party to the proceedings] who submits that *Japanese companies [...] did not attend glass meetings directly but that the other participants (typically the Korean participants) had information on the Japanese manufacturers and informed the Japanese on the discussions in the cartel meetings*. Apart from this, the position of the Japanese companies was the same and shared the same understanding on the collusion as other cartel members” (emphasis added). EC CRTs Decision at footnote 169.

⁴¹⁸ Mitsubishi “Pricing Policy” wanted to “keep A/G [aperture grille] at a premium against S/M [shadow-mask].” See CHU00028534 (Exhibit 8351). See also ME00065027E-28E.

See also ME00115171E – 72E (Exhibit 8356) from a meeting between Mitsubishi and Matsushita: “if the numbers are there, we will make the ND tube to be a price the same as the shadow mask tube.”

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- In June 2002, notes from an internal Mitsubishi meeting discussing a quote to COMPAQ included a chart with Mitsubishi's proposed prices and a column for "Competitor price." Mitsubishi lists "Samsung(SM-F)[flat shadow-mask]" prices.⁴¹⁹
- In March 1998, Mitsubishi provided Philips Consumer Electronics with a quote for 17" DIAMONDTRON CRTs.⁴²⁰ Mitsubishi offered a "10% premium against Hitachi 0.26mm/HC CRTs."⁴²¹
- In August 2001, Mitsubishi met with Samsung SDI and noted that "For 17", the price difference...in SMF-AG [flat shadow-mask – aperture grille] is \$15 to 20," and "For 19"...the SMF-AG difference is \$25."⁴²²

- (156) Because the products compete with one another,⁴²³ and because Mitsubishi based its pricing at least in part on the price for shadow-mask CRTs, price increases agreed upon and implemented by Mitsubishi's Co-conspirators would likely lead to higher prices for Mitsubishi's aperture grille CRTs, providing Mitsubishi with an incentive to collude. As discussed above, the Co-conspirators recognized that there were different types of CRTs and coordinated on price differentials between these different types.⁴²⁴ In addition, with differentiated products, smaller firms can have a relatively larger presence in some segments of the market and hence have similar incentives to larger firms.
- (157) The Co-conspirators' actions indicate that they viewed coordination with Mitsubishi to be important. This is evidenced by the numerous documented discussions presented in Section VI.B, where Mitsubishi discussed pricing and production plans with other Co-conspirators. If Mitsubishi was not a meaningful competitor and was not relevant to the cartel, there would be no reason for the Co-conspirators to spend the effort and incur the risk related to these meetings and communications. The importance of Mitsubishi to the cartel is also directly stated at times in the Co-conspirators' documents. For example, certain other Co-conspirators discussed that "Maintenance of the 21" price depends on prices for 19" LCDs and Mitsubishi CRTs."⁴²⁵ Similarly, the stated purposes of a March 2003 meeting between Mitsubishi and Samsung SDI were "(1) Explanation on the shutdown of Mitsubishi Mexico 17" Line →discussed the possible sales of Mexico line to SDI (2) To get SDI's opinion prior to price negotiations with Samsung Electronics (3) CDT price maintenance (4) To transfer Mitsubishi's customers to SDI due to the discontinuation of 17" CDT, on the reverse side,

⁴¹⁹ See ME00062547E-49E (Exhibit 8357).

⁴²⁰ Mitsubishi branded it as aperture-grille CRTs as "Diamondtron."

⁴²¹ See ME00067342-49 at 45.

⁴²² See ME00025688E (Exhibit 6131).

⁴²³ See, e.g., Deposition of Princeton Display Technologies, Inc. Suprasad Baidyaroy, PhD, June 7, 2106 at 20.

⁴²⁴ See, e.g., CHU00031006 and discussion in paragraphs (85) and (87) of this report.

⁴²⁵ ME 00131622E.

expansion of 21" CDT business by Mitsubishi following the stoppage of 21" CDT business at SDI.”⁴²⁶

- (158) While Mitsubishi was not as large a manufacturer as some Co-conspirators, this does not necessarily imply that Mitsubishi had no incentive to participate in the cartel. As shown by an examination of the market shares presented above, Mitsubishi’s share of CDTs was similar to other Co-conspirators’ shares of either CDTs or CPTs. For example, in 2001 Mitsubishi’s share of CDTs was the same or larger than that of several Co-conspirators, including MTPD in CDTs and Chunghwa, Hitachi, IRICO, and Thai CRT in CPTs. In the same year, Mitsubishi’s overall share of CRTs was also similar to that of several Co-conspirators.
- (159) In practice, smaller firms have often participated in cartels. For example, consider the vitamins cartel. The vitamins cartel involved some participants that were smaller than other conspirators, and in several instances were smaller than Mitsubishi on a relative basis.⁴²⁷ An economic textbook explains that “[a]lthough the exact amounts by which the cartel raised prices are subject to dispute, the increases during the cartel period were sizable. For example, the average price for vitamin A rose by 40 percent and that of vitamin E increased over 60 percent.”⁴²⁸
- (160) Regardless of the size of its relative share, Mitsubishi’s CRT sales still involved a significant amount of commerce. During the class period, the available data indicate that Mitsubishi sold at least \$3.7 billion in CRTs. Even a modest percentage increase in prices as a result of the cartel would result in significant additional earnings by Mitsubishi.
- (161) Mitsubishi also had an approximately 20% ownership interest in Thai CRT,⁴²⁹ a frequent attendee at the glass meeting (see Section IV.B) and a company implicated by the JFTC for its role in the cartel. Mitsubishi had a seat on the Thai CRT board,⁴³⁰ provided Thai CRT manufacturing equipment,⁴³¹ provided manufacturing expertise,⁴³² assigned or “seconded” Mitsubishi employees to Thai CRT (mostly related to CRT production),⁴³³ and sent executives to visit the Thai CRT plant(s) from time to time.⁴³⁴ As part of a “technology transfer agreement” with Thai CRT, Mitsubishi received a

⁴²⁶ SDCRT-0006041E–2E at 1E (Exhibit 635EF).

⁴²⁷ See, e.g., EC Commission Decision regarding the vitamins cartel, November 2001. For example, see ¶123.

⁴²⁸ Dennis W. Carlton and Jeffrey M. Perloff (2005), *Modern Industrial Organization*, 4th edition, at 142-143.

⁴²⁹ See Hideo Innami (Mitsubishi) Deposition, 90 and ME00072237 (Exhibit 8344).

⁴³⁰ See Hideo Innami (Mitsubishi) Deposition, 90, 102-103 and ME00088539-40 (Exhibit 6137E).

⁴³¹ See Hideo Innami (Mitsubishi) Deposition, 91-93.

⁴³² See, for example, ME00073241E (Exhibit 8345) and ME00072913 (Exhibit 8346).

⁴³³ See Hideo Innami (Mitsubishi) Deposition, 95-97.

⁴³⁴ See Hideo Innami (Mitsubishi) Deposition, 108-109.

Some meeting notes suggest that the Co-conspirators were aware of the relationship between Thai CRT and Mitsubishi. For example, notes from a February 1996 meeting between Chunghwa and Toshiba refer to Thai CRT as “THAI-CRT (MITSUBISHI)” and reflect a discussion of Thai CRT’s production by line. See CHU00028304E. As another example,

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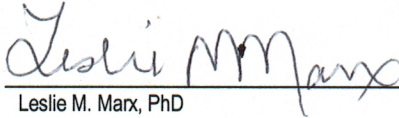
percentage of Thai CRT's sales (between 1% and 2%).⁴³⁵ This ownership stake would tend to increase Mitsubishi's incentives to participate in the cartel and support its effectiveness, and it provided an additional opportunity for Mitsubishi to interact with another Co-conspirator (that itself attended the glass meetings).

notes from a meeting between Chunghwa and Thai CRT also reflect the relationship between Mitsubishi and Thai CRT, specifically related to production technology ("Originally, Diamondtron's slot mask technology was Sony's patent, Sony agreed to let Mitsubishi use it. Mitsubishi has no right to pass it directly to Thai CRT". *See* CHU00028544E-46E.

⁴³⁵ *See* Hideo Innami (Mitsubishi) Deposition, 91-93. *See also* ME73237E (Exhibit 8344).

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Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. This declaration was executed on the first day of September at Durham, North Carolina.



Leslie M. Marx, PhD

September 1, 2016

Date

Appendix A. CV of Leslie M. Marx

A.1. Summary of experience

Leslie M. Marx is the Robert A. Bandeen Professor of Economics at the Fuqua School of Business at Duke University. She is an expert in auctions, vertical contracting, antitrust liability, and cartels. Dr. Marx is well known for her innovative ideas in the areas of industrial organization, applied game theory, auctions, procurements, and collusion. She served as Chief Economist of the Federal Communications Commission from August 2005 through August 2006.

Dr. Marx has published extensively in peer-reviewed journals and elsewhere on topics related to industrial organization, applied game theory, auctions, procurements, and collusion. Her published work includes papers on collusive mechanisms, incentives in procurement contracting, slotting allowances, and exclusive dealing.

A.2. Education

- PhD, Economics, Northwestern University
- MA, Economics, Northwestern University
- BS, Mathematics, Duke University

A.3. Professional experience

- Fuqua School of Business and Department of Economics, Duke University
 - Robert A. Bandeen Professor of Economics, 2013–present
 - William and Sue Gross Research Fellow and Professor of Economics, 2012–2013
 - Professor of Economics, 2008–2013
- Visiting Professor, Department of Economics, University of Melbourne, 2012
- Associate Professor of Economics, Fuqua School of Business, Duke University, 2002–2008 (with tenure). On leave 2005–2006
- Chief Economist, US Federal Communications Commission (FCC), 2005–2006

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- W.E. Simon Graduate School of Business Administration, University of Rochester
 - Associate Professor of Economics and Management, 2000–2002 (with tenure), 1999–2000
 - Assistant Professor of Economics and Management, 1994–1999
- Visiting Associate in Economics, California Institute of Technology, 2000

A.4. Teaching

- MBA: Managerial Economics, Environmental Economics, Managerial Decision Analysis, Managerial Game Theory
- Executive MBA: Environmental Economics, Managerial Decision Analysis, Managerial Economics, Managerial Game Theory
- PhD: Game Theory, Industrial Organization

A.5. Testifying experience

- *In re Urethane Antitrust Litig.*, No. 08-cv-05169 (D.N.J. filed 2008). Expert report, deposition, and trial testimony: 2013–2016.
- *In re Anderson News, L.L.C. v. Am. Media, Inc.*, No. 09-cv-2227 PAC (S.D.N.Y.). Expert report and deposition: 2014.
- *In re Petition of Pandora Media, Inc.*, No. 12-cv-8035 (S.D.N.Y. filed 2013). Expert reports, declaration, deposition, and trial testimony: 2013–2014.
- *In re TFT-LCD (Flat Panel) Antitrust Litig.*, MDL No. 07-1827 (N.D. Cal. filed 2007). Expert reports and deposition testimony: 2011–2014.
- *In re Elec. Carbon Prod. Antitrust Litig.*, No. 05-6042 (D.N.J. filed 2006) Expert report: 2009.

A.6. Selected consulting experience

- Prepared as a testifying expert on behalf of DOJ in support of its successful challenge of the proposed \$34.6 billion merger of Halliburton and Baker Hughes.
- In the matter *ACCC v. Informed Sources*, provided economic analysis on behalf of the Australian Competition and Consumer Commission in its Federal Court of Australia proceedings against Informed Sources. Analyzed whether the retail gasoline price information provided by Informed

Sources to fuel retailers that subscribed to the service likely lessened competition in metropolitan Melbourne.

- In the matter *In re Chocolate Confectionary Antitrust Litigation*, assisting testifying expert on behalf of defendant regarding its participation in an alleged price-fixing conspiracy of chocolate candy products in the United States.
- Filed a report with the FCC. The report, written on behalf of Verizon, opines that proposals to restrict Verizon's and AT&T's participation in the upcoming Incentive Auction for wireless spectrum would "put at risk its twin priorities of raising significant revenue and reallocating a substantial amount of spectrum from broadcast to mobile wireless services." Analysis provides evidence that the FCC could not impose significant bidding restrictions without materially reducing auction revenues and risking outright auction failure.
- Assisted lead testifying expert in *United States ex rel. Bunk v. Birkart Globistics* and *United States ex rel. Ammons v. Pasha Group*. On behalf of the United States, provided support on economic damages related to a conspiracy by Department of Defense contractors for moving services.
- Submitted a white paper to and participated in meetings with DOJ and the FCC on behalf of the Communications Workers of America, an interested party in the proposed T-Mobile/AT&T merger. Opined on the appropriate methods of analysis and horizontal and vertical concerns with the proposed merger.
- Provided economic analysis related to the Comcast-NBCU merger on behalf of Bloomberg, LP. Conditions were imposed on the transaction to protect Bloomberg TV and other competitors of Comcast-NBCU's business news network CNBC from being disadvantaged.
- In *In re Vitamins Antitrust Litigation*, served as a consulting expert. Worked closely with Bates White professionals to examine whether the economic evidence was inconsistent with noncooperative conduct during a period of time predating the defendants' guilty pleas.
- In *Oxford Health Plans v. Liberty Surplus Ins. Corp.*, provided an expert report and deposition testimony for Liberty Surplus Insurance Corporation in litigation that concerned Oxford Health Plans' settlement negotiations in a securities class action lawsuit.

A.7. Consulting

- Bates White Economic Consulting, Washington, DC, 2002–2005, 2007–present
- Bloomberg, LP, 2010
- Federal Communications Commission, Washington, DC, 2006–2007
- Latex International, Ansonia, CT, 2001
- Xerox Corp., Rochester, NY, 1999
- Rochester Gas & Electric Corp., Rochester, NY, 1997, 1998
- Eastman Kodak Company, Rochester, NY, 1995, 1996, 1999

A.8. Publications

A.8.a. Research papers in academic journals

- “Club Good Intermediaries.” With Simon Loertscher. Forthcoming in *International Journal of Industrial Organization*.
- “A Long Way Coming: Designing Centralized Markets with Privately Informed Buyers and Sellers.” With Simon Loertscher and Tom Wilkening. *Journal of Economic Literature* 53(4): 857–97 (2015).
- “Antitrust Leniency with Multiproduct Colluders.” With Claudio Mezzetti and Robert C. Marshall. *American Economic Journal: Microeconomics* 7(3), 205–240 (2015).
- “Buyer Resistance for Cartel versus Merger.” With Vikram Kumar, Robert C. Marshall, and Lily Samkharadze. *International Journal of Industrial Organization* 39 (2015): 71–80.
- “Effects of Antitrust Leniency on Concealment Effort by Colluding Firms.” With Claudio Mezzetti. *Journal of Antitrust Enforcement* 2(2), 305–332 (2014). Winner of Best Economics Article–2015 Antitrust Writing Awards.
- “An Oligopoly Model for Analyzing and Evaluating (Re)-Assignments of Spectrum Licenses.” With Simon Loertscher. *Review of Industrial Organization* 45, no. 3 (2014): 245–73.
- “Plus Factors and Agreement in Antitrust Law.” With William E. Kovacic, Robert C. Marshall, and Halbert L. White. *Michigan Law Review* 110, no. 3 (2011): 393–436. Winner of the 10th Annual Jerry S. Cohen Memorial Fund Writing Award for the best antitrust piece during the prior year.

- “Bidder Collusion at First-Price Auctions.” With Giuseppe Lopomo and Peng Sun. *Review of Economic Design* 15, no. 3 (2011): 177–211.
- “Carbon Allowance Auction Design: An Assessment of Options for the U.S.” With Giuseppe Lopomo, David McAdams, and Brian Murray. *Review of Environmental Economics and Policy* 5, no. 1 (2011): 25–43.
- “Coordinated Effects in the 2010 *Horizontal Merger Guidelines*.” With Wayne-Roy Gayle, Robert C. Marshall, and Jean-Francois Richard. *Review of Industrial Organization* 39, no. 1 (2011): 39–56.
- “The Economics of Contingent Re-Auctions.” With Sandro Brusco and Giuseppe Lopomo. *American Economic Journal: Microeconomics* 3, no. 2 (2011): 165–93.
- “Break-Up Fees and Bargaining Power in Sequential Contracting.” With Greg Shaffer. *International Journal of Industrial Organization* 28, no. 5 (2010): 451–63.
- “Slotting Allowances and Scarce Shelf Space.” With Greg Shaffer. *Journal of Economics & Management Strategy* 19, no. 3 (2010): 575–603.
- “Cartels as Two-Stage Mechanisms: Implications for the Analysis of Dominant-Firm Conduct.” With Randal D. Heeb, William E. Kovacic, and Robert C. Marshall. *Chicago Journal of International Law* 10, no. 1 (2009): 213–31.
- “Individual Accountability in Teams.” With Francesco Squintani. *Journal of Economic Behavior & Organization* 72, no. 1 (2009): 260–73.
- “Quantitative Analysis of Coordinated Effects.” With William E. Kovacic, Robert C. Marshall, and Steven P. Schulenberg. *Antitrust Law Journal* 76, no. 2 (2009): 397–430.
- “The ‘Google Effect’ in the FCC’s 700 MHz Auction.” With Sandro Brusco and Giuseppe Lopomo. *Information Economics and Policy* 21, no. 2 (2009): 101–14.
- “The Vulnerability of Auctions to Bidder Collusion.” With Robert C. Marshall. *Quarterly Journal of Economics* 124, no. 2 (2009): 883–910.
- “Cartel Price Announcements: The Vitamins Industry.” With Robert C. Marshall and Matthew E. Raiff. *International Journal of Industrial Organization* 26, no. 3 (2008): 762–802. Awarded the 2009 Paul Geroski Best Article Prize for one of the best two articles published in the *International Journal of Industrial Organization* in 2008.
- “Bidder Collusion.” With Robert C. Marshall. *Journal of Economic Theory* 133, no. 1 (2007): 374–402.
- “Exploring Relations Between Decision Analysis and Game Theory.” With Jules van Binsbergen. *Decision Analysis* 4, no. 1 (2007): 32–40.

- “Rent Shifting and the Order of Negotiations.” With Greg Shaffer. *International Journal of Industrial Organization* 25, no. 5 (2007): 1109–25.
- “Upfront Payments and Exclusion in Downstream Markets.” With Greg Shaffer. *RAND Journal of Economics* 38, no. 3 (2007): 823–43.
- “Economics at the Federal Communications Commission.” *Review of Industrial Organization* 29, no. 4 (2006): 349–68.
- “Inefficiency of Collusion at English Auctions.” With Giuseppe Lopomo and Robert C. Marshall. *B.E. Journal of Theoretical Economics* 5, no. 1 (2005).
- “Opportunism and Menus of Two-Part Tariffs.” With Greg Shaffer. *International Journal of Industrial Organization* 22, no.10 (2004): 1399–1414.
- “Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity: Comment.” With Greg Shaffer. *American Economic Review* 94, no. 3 (2004): 796–801.
- “The Joint Determination of Leverage and Maturity.” With Michael J. Barclay and Clifford W. Smith, Jr. *Journal of Corporate Finance* 9, no. 2 (2003): 149–67. Winner of Outstanding Paper in Corporate Finance at the 1997 Southern Finance Association Meetings.
- “Adverse Specialization.” With Glenn M. MacDonald. *Journal of Political Economy* 109, no. 4 (2001): 864–99.
- “Insurer Ownership Structure and Executive Compensation as Complements.” With David Mayers and Clifford W. Smith, Jr. *Journal of Risk and Insurance* 68, no. 3 (2001): 449–63. Winner of Outstanding Paper in Financial Services at the 1998 Southern Finance Association Meetings.
- “Dynamic Voluntary Contribution to a Public Project.” With Steven A. Matthews. *Review of Economic Studies* 67, no. 2 (2000): 327–58.
- “Adaptive Learning and Iterated Weak Dominance.” *Games and Economic Behavior* 26, no. 2 (1999): 253–78.
- “Odd-Eighth Avoidance as a Defense Against SOES Bandits.” With Eugene Kandel. *Journal of Financial Economics* 51, no.1 (1999): 85–102.
- “Payments for Order Flow on NASDAQ.” With Eugene Kandel. *Journal of Finance* 54, no. 1 (1999): 35–66.
- “Predatory Accommodation: Below-Cost Pricing Without Exclusion in Intermediate Goods Markets.” With Greg Shaffer. *RAND Journal of Economics* 30, no. 1 (1999): 22–43.

- “Process Variation as a Determinant of Bank Performance: Evidence from the Retail Banking Study.” With Frances Frei, Ravi Kalakota, and Andrew Leone). *Management Science* 45, no. 9 (1999): 1210–20.
- “Efficient Venture Capital Financing Combining Debt and Equity.” *Review of Economic Design* 3, no. 4 (1998): 371–87; Winner of the Koç University Prize for the Best Paper of the Year in *Review of Economic Design*.
- “The Effects of Transaction Costs on Stock Prices and Trading Volume.” With Michael J. Barclay and Eugene Kandel. *Journal of Financial Intermediation* 7, no. 2 (1998): 130–50.
- “Cost Effective Use of Muscle Relaxants: A Decision Analysis.” With Jeffrey S. Rubenstein, Wendy Colin, Darryl Jackson, Craig Lockwood, and Janice Molloy. *Pediatrics* 100, no. 3 (1997): 451–52.
- “NASDAQ Market Structure and Spread Patterns.” With Eugene Kandel. *Journal of Financial Economics* 45, no. 1 (1997): 35–60.
- “Order Independence for Iterated Weak Dominance.” With Jeroen M. Swinkels. *Games and Economic Behavior* 18, no. 2 (1997): 219–45.

A.8.b. Research papers published in books and conference volumes

- “Leniency, Profiling and Reverse Profiling: Strategic Challenges for Competition Authorities.” With Claudio Mezzetti. In C. Beaton-Wells and C. Tran, eds., *Anti-Cartel Enforcement in a Contemporary Age: The Leniency Religion*, Hart Publishing, 2015.
- “Tacit Collusion in Oligopoly.” With Edward J. Green and Robert C. Marshall. In *Oxford Handbook of International Antitrust Economics*, vol. 2, eds. Roger D. Blair and D. Daniel Sokol. Oxford University Press, 464–497 (2015).
- “Section 1 Compliance from an Economic Perspective.” With Robert C. Marshall. In *William E. Kovacic: An Antitrust Tribute Liber Amicorum*, vol. 2, eds. Nicolas Charbit and Elisa Ramundo, 293–302. New York: Institute of Competition Law, 2014.
- “What Next? Cartel Strategy After Getting Caught.” With Robert C. Marshall and Claudio Mezzetti. In *Competition Law and Economics: Beyond Monopoly Regulation*, East-West Center and Korea Development Institute Monograph Series. Edward Elgar, forthcoming.
- “Economics and the Efficient Allocation of Spectrum Licenses.” With Simon Loertscher. In *Mechanisms and Games for Dynamic Spectrum Access*, eds. Tansu Alpcan, Holger Boche, Michael L. Honig, and H. Vincent Poor. Cambridge University Press, 2014.

- “The Economics of Auctions and Bidder Collusion.” With Robert C. Marshall and Michael J. Meurer. In *Game Theory and Business Applications*, 2nd ed., eds. Kalyan Chatterjee and William F. Samuelson. New York: Kluwer Academic Publishers, 2014.
- “Coordinated Effects in Merger Review: Quantifying the Payoffs from Collusion.” With William E. Kovacic, Robert C. Marshall, and Steven P. Schulenberg. In *Annual Proceedings of the Fordham Competition Law Institute: International Antitrust Law & Policy*, ed. Barry E. Hawk, 271–85. Huntington, NY: Juris Publishing, Inc., 2007.
- “Lessons for Competition Policy from the Vitamins Cartel.” With William E. Kovacic, Robert C. Marshall, and Matthew E. Raiff. In *The Political Economy of Antitrust*, vol. 282, eds. Vivek Ghosal and Johan Stennek, 149–76. New York: Elsevier, 2007.
- “Bidding Rings and the Design of Anti-Collusion Measures for Auctions and Procurements.” With William E. Kovacic, Robert C. Marshall, and Matthew E. Raiff. In *Handbook of Procurement*, eds. Nicola Dimitri, Gustavo Piga, and Giancarlo Spagnolo, 381–411. Cambridge University Press, 2006.

A.8.c. Books

- *The Economics of Collusion: Cartels and Bidding Rings*. With Robert C. Marshall. Cambridge: MIT Press, 2012.

A.9. Honors and awards

- Outstanding paper awards as listed above
- Game Theory Society, Council Member, 2013–present
- FCC Woman Leader, Minority Media and Telecommunications Council, April 2013
- Top 100 Women in Antitrust, *Global Competition Review*, March 2013
- Business School Professor of the Week, *Financial Times*, July 2012
- Alfred P. Sloan Doctoral Dissertation Fellowship, 1993–1994
- Teaching Honor Roll, Simon School of Business, University of Rochester, 1999, 2001
- National Science Foundation Graduate Fellowship, 1989–1992
- Mary Love Collins Memorial Scholarship, 1989–1990
- Julia Dale Memorial Award in Mathematics, 1989
- Marie James Postgraduate Scholarship, 1989

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- Phi Eta Sigma Graduate Scholarship, 1989
- Duke University Valedictorian, 1989
- Alice M. Baldwin Scholarship 1988–1989
- Duke University Faculty Scholar Award, 1988–1989
- Phi Chi Theta Foundation Scholarship, 1988–1989
- Phi Eta Sigma Senior Award, 1988–1989
- Golden Key National Honor Society Scholarship, 1987–1988
- National Merit Scholarship, 1985
- Phi Beta Kappa Scholarship, 1985

A.10. Professional activities

- Editorial Board, *American Economic Journal: Microeconomics*, 2007–present
- Editorial Board, *International Journal of Game Theory*, 2009–present
- Editorial Board, *Journal of Economic Literature*, 2010–2012
- Advisory Editor, *Games and Economic Behavior*, 2010–2012
- Associate Editor, *International Economic Review*, 2002–2005
- Referee: *American Economic Review*, *Econometrica*, *Games and Economic Behavior*, *International Journal of Industrial Organization*, *Journal of Economic Theory*, *RAND Journal of Economics*, *Review of Economic Studies*, *Review of Industrial Organization*

Appendix B. Materials relied upon

All materials cited in the body and footnotes of my report are hereby incorporated by reference.

B.1. Expert reports from CRT MDL

- Rebuttal Declaration of Robert D. Willig, March 25, 2013
- Expert Report of Robert D. Willig, September 10, 2013
- Expert Report of Vandy Howell, April 15, 2014
- Expert Report of Gordon Klein, April 15, 2014
- Expert Report of Lawrence Wu, April 15, 2014
- Expert Report of William S. Comanor, April 15, 2014
- Expert Report of Kenneth G. Elzinga, April 15, 2014
- Expert Report of Jerry A. Hausman, April 15, 2014
- Expert Report of James T. McClave, April 15, 2014
- Expert Report of Janet S. Netz, April 15, 2014
- Expert Report of Mohan Rao, April 15, 2014
- Supplemental Expert Report of Jerry A. Hausman, July 3, 2014
- Reply Expert Report of Dennis W. Carlton, August 5, 2014
- Expert Report of Dov Rothman, August 5, 2014
- Expert Report of Daniel L. Rubinfeld, August 5, 2014
- Expert Report of Edward A. Snyder, August 5, 2014
- Expert Report of Darrell Williams, August 5, 2014
- Opposition Expert Report of Lawrence Wu, August 5, 2014
- Reply Expert Report of Kenneth G. Elzinga, August 5, 2014
- Expert Rebuttal Report of Kenneth G. Elzinga, September 26, 2014
- Expert Rebuttal Report of James T. McClave, September 26, 2014
- Rebuttal Expert Report of Janet S. Netz, September 26, 2014

- Expert Report of Jeffrey J. Leitzinger, Ph.D., November 6, 2014

B.2. Expert depositions from CRT MDL

- Deposition of Jeffrey C. Leitzinger, 2013-08-22
- Deposition of Kenneth Elzinga, 2014-07-17
- Deposition of Kenneth Elzinga, 2014-10-27
- Deposition of Dennis Carlton, 2014-09-16 and 2014-09-17
- Deposition of Dov Rothman, 2014-09-11

B.3. Legal documents

- Second Amended Direct Purchaser Plaintiffs' Class Action Complaint against Mitsubishi and Thomson, *Crago, d/b/a Dash Computers, Inc., et al. v. Mitsubishi Electric Corporation, et al.*, Case No.14-CV-2058 (JST) (August 6, 2015)
- Mitsubishi Electric Corporation's Notice of Motion and Motion for Summary Judgment Based Upon Absence of Evidence of Liability. Case No. 3:07-cv-05944-SC; MDL No. 1917 (November 7, 2014) and supporting exhibits
- Direct Action Plaintiffs' Opposition to Defendant Mitsubishi Electric Corporation's Motion for Summary Judgment Based Upon Absence of Evidence of Liability. Case No. 3:07-cv-05944-SC; MDL No. 1917 (December 23, 2014) and supporting exhibits
- Mitsubishi Electric Corporation's Reply in Support of Its Motion for Summary Judgment Based On Absence of Evidence of Liability. Case No. 3:07-cv-05944-SC; MDL No. 1917 (January 23, 2015) and supporting exhibits
- Mitsubishi Electric Visual Solutions America, Inc.'s Second Supplemental Response to Direct Purchaser Plaintiff Crago, d/b/a Dash Computers, Inc.'s First set of Interrogatories (July 28, 2015)
- Direct Purchaser Plaintiffs' Notice of Motion and Motion for Class Certification with respect to The Thomson and Mitsubishi Defendants; Memorandum of Points and Authorities in Support Thereof. Case No. 3:07-cv-05944-SC; MDL No. 1917 (November 7, 2014) and supporting exhibits
- Direct Purchaser Plaintiffs' Third Supplemental Objections and Responses to Defendant Mitsubishi Electric Corporation's First Set of Interrogatories, Nos. 1, 22. (August 15, 2016)

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- Mitsubishi Electric Defendants Objections and Responses to DPP Princeton's First Interrogatories (July 5, 2016)

B.4. Data

- master_crt_sales_data.dta: CRT sales data produced in the working papers of Expert Report of Jeffrey Leitzinger, November 10, 2014 (including the related raw data and data processing code)

B.5. Other discovery documents and materials

- CHU00123358E – 61E (Exhibit 1276E)
- HDP-CRT00026077 – 78 (Exhibit 1578EF)
- HDP-CRT00049270E – 72E (Exhibit 1580EF)
- SDCRT-0087932 – 33

EXHIBIT B

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

In re Monosodium Glutamate
Antitrust Litigation

Civil File No. 00-MDL-1328 (PAM)

ORDER

This matter is before the Court on Plaintiffs' Motion for Determination and Liquidation of An Award of Damages and All Other Costs Against Defendant Tung Hai Fermentation Industrial Corporation n/k/a Vedan Enterprises Group.

Based upon on all the files, records, and pleadings herein, it is hereby ordered that Plaintiffs are entitled to a judgment against Defendant Tung Hai in the total amount of \$184,700,000.00.

LET JUDGMENT BE ENTERED ACCORDINGLY.

Dated: September 10, 2004

s/ Paul A. Magnuson
Honorable Paul A. Magnuson
United States District Judge

EXHIBIT C

**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

In re Monosodium Glutamate
Antitrust Litigation

)
) Case No. 00-md-01328-PAM
)

) **CLASS ACTION**
)

This document relates to

)
)
) *Y. Hata & Co., Ltd. v. Vedan Enterprise*
) *Corp. (f/k/a Tung Hai Fermentation*
) *Industrial Corp.)*
)

ORDER

This matter came before the undersigned on August 4, 2016. Kristen G. Marttila, of Lockridge Grindal Nauen P.L.L.P. appeared on behalf of Plaintiffs. There was no appearance by or on behalf of Defendant Vedan Enterprise Corp. (“Vedan”), formerly known as Tung Hai Fermentation Industrial Corp.

FINDINGS OF FACT

The Summons and Renewal Complaint were filed with the Court on September 9, 2014, and were served on Defendant Vedan at least by July 17, 2015.

Defendant has failed to file and serve a response of Answer to the Renewal Complaint. The Application for Entry of Default and Affidavit of Heidi M. Siltan In Support Of Entry Of Default were filed with the Court on May 31, 2016. The Clerk’s Entry of Default was entered on June 3, 2016.

Plaintiffs filed this renewal action to enforce an existing judgment against Defendant Vedan. The existing monetary judgment is in the amount of \$184,700,000.00.

Vedan is the judgment debtor with respect to that judgment and has not paid any part of the existing judgment. The judgment is outstanding and valid.

CONCLUSIONS OF LAW

Vedan is in default, and Plaintiffs are entitled to an entry of a default judgment in the amount of \$184,700,000.00, on behalf of the Class previously certified by the Court in its June 8, 2001 Order [Dkt. No. 146] and defined as:

All persons who purchased MSG or nucleotides (IMP, GMP, or I+G, a combination of IMP and GMP), directly from any of the Defendants or their affiliates or co-conspirators in the United States during the period from January 1, 1990 through November 1, 1999. Excluded from the Class are the Defendants, their respective parents, subsidiaries and affiliates, and federal, state and local government entities and political subdivisions, including possessions, commonwealths, and territories.

By operation of 28 U.S.C. § 1961, Plaintiffs also are entitled to post-judgment interest on the original judgment, in the amount of \$41,019,274.94.

ORDER

Accordingly, **IT IS HEREBY ORDERED THAT:**

- 1) Plaintiffs' Motion for Entry of Default Judgment (Docket No. 608) is **GRANTED.**
- 2) The above-defined Class is awarded a monetary judgment as against Defendant Vedan Enterprise Corp. in the sum of \$225,719,274.94, representing:
 - a) \$184,700,000.00 owed under the Court's 2004 judgment (Docket No. 486), and

b) \$41,019,274.94 in post-judgment interest on the 2004 judgment.

LET JUDGMENT BE ENTERED ACCORDINGLY.

Dated: August 4, 2016

s/Paul A. Magnuson

Paul A. Magnuson
United States District Court Judge

EXHIBIT D

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION**

**CONFIDENTIAL – TO BE FILED UNDER SEAL
SUBJECT TO PROTECTIVE ORDER**

**IN RE: CATHODE RAY TUBE (CRT)
ANTITRUST LITIGATION**

Master File No. CV-07-5944-SC

MDL No. 1917

Date: December 12, 2014

Time: 10:00 a.m.

Judge: The Honorable Samuel Conti

Ctrm: 1, 17th Floor

THIS DOCUMENT RELATES TO:

**Crago, d/b/a Dash Computers, Inc., et al. v.
Mitsubishi Electric Corporation, et al., Case
No. 14-CV-2058 SC**

EXPERT REPORT OF JEFFREY J. LEITZINGER, PH.D.

NOVEMBER 6, 2014

**UNREDACTED VERSION OF DOCUMENT
SOUGHT TO BE SEALED**

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I. Experience and Qualifications

1. My name is Jeffrey J. Leitzinger. I am an economist and a Managing Director at Econ One Research, Inc., an economic research and consulting firm with offices in Los Angeles, Sacramento, Berkeley, Houston, Washington D.C., and New Delhi, India. I have both master and doctoral degrees in economics from the University of California at Los Angeles and a bachelor's degree in economics from Santa Clara University. During the 34 years of my professional career, I have worked extensively on the analysis of markets and the assessment of allegations of anti-competitive conduct, including a number of antitrust conspiracy cases. I have testified on numerous occasions as an expert economist in State and Federal courts. A more detailed summary of my training, past experience and prior testimony is shown in **Exhibit 1**.
2. In the course of preparing this report, my staff and I have reviewed discovery documents, depositions and publicly available materials (which are listed in **Exhibit 2**). Econ One is being compensated for the time I spend on this matter at my normal and customary rate of \$705 per hour. Econ One is also being compensated for time spent by research staff on this project at their normal and customary hourly rates.

II. Assignment and Summary of Conclusions

3. Plaintiffs allege that the defendants in the case ("Defendants") and their co-conspirators¹ engaged in a price-fixing conspiracy for the purpose of fixing, raising, maintaining and/or stabilizing prices of cathode ray tubes ("CRTs") and that CRT products (CRTs and finished products incorporating CRTs) were sold at elevated prices in the United States between March 1, 1995 and November 25, 2007 (the "Class Period"). Plaintiffs are direct purchasers of CRT products from the

¹ Defendants are Technicolor SA (f/k/a Thomson SA) and Technicolor USA, Inc. (f/k/a Thomson Consumer Electronics, Inc.) (together, "Thomson") and Mitsubishi Electric Corp.; Mitsubishi Digital Electronics America, Inc.; and Mitsubishi Electric & Electronics, USA, Inc. (together, "Mitsubishi"). Plaintiffs also allege that (1) Chunghwa Entities; (2) Orion Entities; (3) Hitachi Entities; (4) Irico Entities; (5) LG Electronics Entities; (6) LG Philips Display; (7) Panasonic Entities; (8) Philips Entities; (9) Samsung Entities; (10) Thai-CRT; (11) Toshiba Entities; (12) MT Picture Display Co., Ltd.; and (14) Beijing-Matsushita Color CRT Company, Ltd. were members of the alleged conspiracy. See Direct Purchaser Plaintiffs' Complaint Against Mitsubishi and Thomson, May 5, 2014 ("Complaint") and Appendix A.

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Defendants and co-conspirators. Plaintiffs' counsel propose a class of purchasers as follows:

All persons and entities who, between March 1, 1995 and November 25, 2007, directly purchased a CRT Product² in the United States from any defendant or any subsidiary or affiliate thereof, or any co-conspirator or any subsidiary or affiliate thereof. Excluded from the Class are Defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.

4. I previously submitted two related reports in this matter.³ I have been asked by plaintiffs' counsel to update the opinions in those reports based on information that has come to light in the interim and present my opinions regarding the widespread impact of the alleged conspiracy on proposed Class Members.
5. The conspiracy in this case is alleged to have begun in 1995 and continued operating (at least in some fashion) through the commencement of the Department of Justice investigation of the industry in November 2007. According to the Complaint, Defendants and co-conspirators:
 - i. Established targets for minimum prices of various CRTs defined by size and application, as well as elevated market price levels for CRTs overall;
 - ii. Agreed to restrain output and capacity;
 - iii. Discussed and agreed upon prices as to specific customers; and
 - iv. Exchanged information on pricing, shipments, capacity, output, and production line status for CRTs.

² CRT products include CRTs, CRT TVs, and CRT monitors.

³ Corrected Expert Report of Jeffrey J. Leitzinger, August 1, 2013 ("Leitzinger Class Report"); and Reply Expert Report of Jeffrey J. Leitzinger, November 9, 2013 ("Leitzinger Reply Class Report").

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6. In the course of my work on this assignment, my staff and I have reviewed extensive data, documents and testimony developed through the course of discovery in this case. A list of the materials we have reviewed is included as Exhibit 2. Based upon my review and analysis of these materials, I have concluded that there is evidence common to members of the proposed Class that is sufficient to prove widespread impact. This evidence involves:
- The broad extent of communication and cooperative activities within the alleged conspiracy;
 - Activities that would have assisted the alleged conspiracy in constraining output of CRTs;
 - The alleged conspiracy's control over the vast majority of sales;
 - Regression analysis showing prices of CRTs to be largely determined by factors that are common to Class Members;
 - Jointly determined "Target Prices" for CRTs representing the vast majority of total sales;
 - Structural elements in CRT pricing that tended to link prices for CRTs of different types and sizes;
 - Regression analysis showing that "Target Prices" established through the alleged conspiracy had a demonstrable effect on actual prices paid; and
 - The existence of other market characteristics which would be expected as an economic matter to cause the effects of conspiratorial behavior to be felt broadly across customers.
7. I set forth the basis for these conclusions below. I understand that discovery has not yet been completed and that further evidence might emerge that is relevant to my analysis. I intend to consider additional evidence as it develops and may revise my conclusions or supplement their evidentiary basis as warranted by that evidence.

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III. CRT Industry Background

8. CRTs were the dominant technology used in televisions and computer monitors, automated teller machines, gaming devices, measuring instruments and electronic medical devices (collectively “display products”) from the 1950s into the 2000s.⁴ Since then, liquid crystal displays (“LCDs” or “TFT-LCDs”) have supplanted CRTs in most display applications.⁵

A. Product Description

9. A cathode ray tube (“CRT”) is a funnel-shaped glass device which translates electronic video signals into visual images. The main components of a CRT are an electron gun assembly, a deflection system and a phosphor-coated screen, all encased in a large vacuum-filled glass bulb.⁶ The electron gun, placed at the rear end of the bulb, consists of a negatively charged cathode which emits electrons when heated and a positively charged anode which directs the electrons into a narrow beam and accelerates them towards the screen.⁷ The electron beam passes through a deflection

⁴ For a brief history of CRT technology see EPA, “Computer Display Industry and Technology Profile,” December 1998, 1 and 3-4, http://www.epa.gov/dfe/pubs/comp-dic/tech_reports/index.htm and Industry and U.S. International Trade Commission, “Industry & Trade Summary: Television Picture Tubes and Other Cathode-Ray Tubes,” Publication 2877, May 1995, 1 and 11, http://www.usitc.gov/publications/332/working_papers/pub2877.pdf. See also PHLP-CRT-051982-PHLP-CRT-052085 at 052057.

⁵ Paul Sakuma, “Flat panels drive old TVs from market,” *USA Today*, October 22, 2006, http://www.usatoday.com/tech/products/gear/2006-10-22-crt-demise_x.htm; Hitachi, “Hitachi’s Flat-panel TV Business Strategy,” April 18, 2007, 7 and 10, <http://www.hitachi.com/IR-e/library/presentation/070418/070418.pdf>; PR Newswire, “Stanford Resources Experts Forecast Major Shifts in CRT monitor Marketplace,” New York, October 2, 2001, <http://www.prnewswire.com/news-releases/stanford-resources-expert-forecasts-major-shifts-in-crt-monitor-marketplace-73466017.html>.

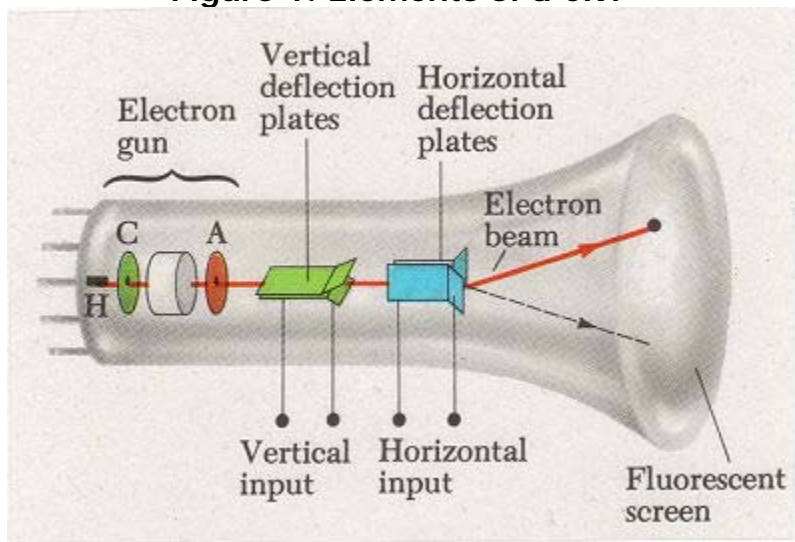
⁶ For detailed descriptions and a schematic diagram of the design and construction of CRTs see U.S. International Trade Commission, “Industry & Trade Summary: Television Picture Tubes and other Cathode-Ray Tubes,” May 1995, 1-2, http://www.usitc.gov/publications/332/working_papers/pub2877.pdf and EPA, “Computer Display Industry and Technology Profile,” December 1998, 12-13, http://www.epa.gov/dfe/pubs/comp-dic/tech_reports/index.htm.

⁷ Polychromatic CRT tubes contain three electron guns, one for each color - red, green and blue; unlike monochromatic tubes that contain only one electron gun and produce a black-and-white image. See Fleischmann, Mark, “The Big Picture,” *Popular Science*, November 1994, 84 and 92. For an overview of CRT technology, see Laurel M. Sheppard and C. Cavette, “Cathode-Ray Tube,” <http://www.madehow.com/Volume-2/Cathode-Ray-Tube.html#b>.

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system that aims it vertically and horizontally, towards the right spot on the screen.⁸ The screen is coated with phosphors which illuminate when the electron beam strikes. Images are produced as the incoming video signal generates electron beams of varying strengths that rapidly scan the screen up and down and back and forth, creating illumination patterns that the human eye recognizes as images.

Figure 1: Elements of a CRT⁹



10. This basic design of the CRT remained the same for over half a century, though technological progress and refinement of materials allowed the quality to improve over time. These improvements included reduced ‘warm up’ time and ‘flicker’, sharper images and bigger, flatter screens with minimum curvature. High definition televisions with scanning rates more than twice those of conventional systems became possible with improved electron gun design as well as new glass materials. Recent improvements include ‘Superslim’ and ‘Ultraslim’ CRT’s (introduced by LG Electronics and Samsung, respectively).¹⁰

⁸ See PHLP-CRT-051982- PHLP-CRT-052085 at 052057.

⁹ Quarkology.com, “9.4.A- Cathode Rays,” <http://www.quarkology.com/12-physics/94-ideas-implementation/94A-cathode-rays.html>.

¹⁰ CDRinfo, “LG Super-slim CRT set to change entry-level television market,” <http://lux.cdrinfo.com/Sections/News/Details.aspx?NewsId=13874>; PR Newswire, “LG Philips Displays Brings SuperSlim Technology to the U.S. Market,” January 6, 2005, <http://www.prnewswire.com/news-releases/lgphilips-displays-brings-superslim-technology-to-the-us-market-53883862.html>; Samsung,

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B. Product Varieties

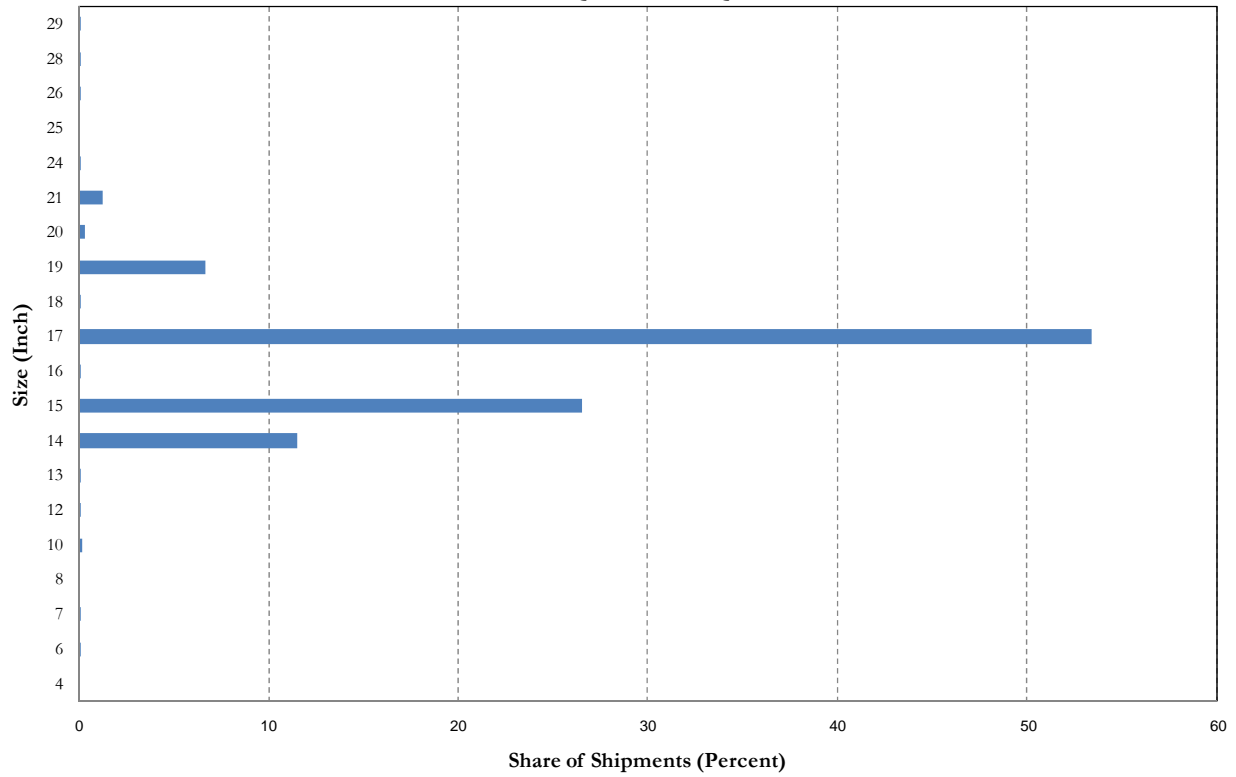
11. CRTs differed mainly by type of use, size, and display resolution, though other characteristics, such as shape, sometimes varied as well. The vast majority of CRT displays sold during the Class Period were able to display color images. CRTs were sometimes sold in different stages of assembly. A CRT sold without a deflection yoke was called a “bare” CRT, while those sold with a deflection yoke were characterized as having an “integrated tube component” (ITC). CRTs used in televisions are often referred to as “CPTs” (color picture tubes). CRTs used in computer monitors and other similar devices like ATMs are referred to as “CDTs” (color display tubes). The basic technology of CDTs and CPTs is the same. CDTs accommodate the higher resolutions desirable for computer monitors while CPTs display brighter pictures to accommodate daytime TV viewing.¹¹
12. The quality of the viewing experience generated by a CRT is determined by a number of different characteristics. The two most important characteristics are the screen size and resolution. The screen size, defined as the diagonal distance measured in inches, determines the viewable area. As depicted in Figure 2 and Figure 3 below, the most widely produced sizes for CPTs were 14, 20, 21, and 29 inches; for CDTs the most widely produced sizes were 14, 15 and 17 inches. These sizes accounted for about 79 percent of total CPT sales and about 91 percent of CDT sales during the class period.

“Samsung SDI Develops the ‘Ultra-slim and Flat CRT,’” <http://www.samsung.com/us/news/517>.

¹¹ SDCRT-0021278 - SDCRT-0021294 at 1288-1289 and SDCRT-0202981 at 6 and 12. See also, Deposition of Mok Hyeon Seong (LGE), July 9, 2012 at 97:13-98:9 and Deposition of L. Thomas Heiser (Hitachi), July 3, 2012 at 59:3-60:4.

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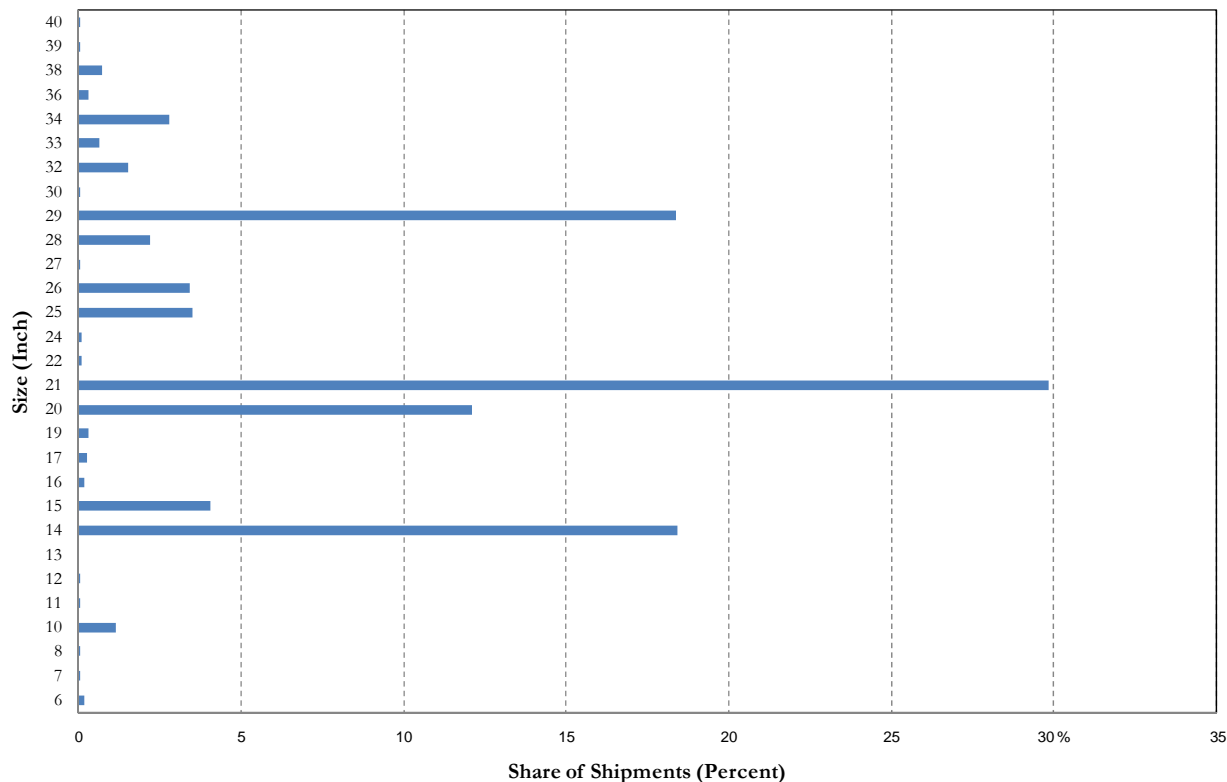
Figure 2
Size Distribution of CDTs
1995Q1 to 2007Q4



Source: CRT Manufacturers' Sales Data.

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Figure 3
Size Distribution of CPTs
1995Q1 to 2007Q4



Source: CRT Manufacturers' Sales Data.

C. The CRT Defendants and Co-Conspirators

13. The Defendants and co-conspirators in this matter (listed in Appendix A) were generally large multinational corporations (or their subsidiaries), including: (1) Mitsubishi Entities (Mitsubishi); (2) Thomson Entities (Thomson); (3) Chunghwa Entities (Chunghwa); (4) Orion Entities (Orion); (5) Hitachi Entities (Hitachi); (4) Irico Entities (Irico); (6) LG Electronics Entities (LG Electronics); (7) LG Philips Display Entities (LPD); (8) Panasonic Entities (Panasonic); (9) Philips Entities (Philips); (10) Samsung Entities (Samsung); (11) Thai-CRT; (12) Toshiba Entities (Toshiba); (13) MT Picture Display Co., Ltd. (MTPD); and (14) Beijing-Matsushita Color CRT Company, Ltd. (BMCC). These companies accounted for 85 – 100 percent of CDT sales and 70 – 80 percent of CPT sales during the class period.¹²

¹² For CDT, see SDCRT-0201291; CHU00071226; CHU00154037-CHU00154420 at 154389-90;

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14. CRTs were sold to electronics product manufacturers, primarily for the manufacture of computer monitors and televisions. These product manufacturers included original equipment manufacturers (“OEMs”), which sold finished products under their own brand name. Product manufacturers also included contract manufacturers (“CMs”), which made finished CRT products for other brand name sellers. There were two types of CMs, Electronics Manufacturing Services (“EMSs”), which made products according to their customers’ designs and Original Design Manufacturers (“ODMs”) such as TVP Technology,¹³ which owned and developed the product design.¹⁴ Defendants and co-conspirators also sold CRTs to distributors such as TT Electronics,¹⁵ which then resold them to smaller OEMs and CMs. Some members of the alleged conspiracy, including Mitsubishi, Thomson, Hitachi, LG Electronics, Panasonic, Philips, Samsung, and Toshiba, also produced computer monitors or televisions incorporating the CRTs they manufactured. These were sold mainly to retailers such as Best Buy, Fry’s Electronics, Wal-Mart, Circuit City, and Sears.

D. Changes in CRT Demand over Time

15. CRT televisions were first introduced to the American public in 1939 at the World’s Fair by RCA,¹⁶ and color CRT televisions appeared in the 1950s.¹⁷ Until the later part of the 1990s, CPTs were the dominant display technology used in televisions. In addition, CRT monitors became “the dominant method for interfacing with

CHU00281352-CHU00281923 at 281644-45; CHWA00062147-CHWA00062569 at 62427; CHWA00088192-CHWA00088762 at 88484; CHWA00106460-CHWA00106757 at 106730. For CPT, see MTPD-0416090.

¹³ Bloomberg, “Company Profile for TPV Technology Ltd. (903),” <http://www.bloomberg.com/quote/903:HK/profile>.

¹⁴ See Austin Weber, “Outsourcing’s Alphabet Soup,” *Assembly Magazine*, February 1, 2003, 8, <http://www.assemblymag.com/articles/82852-outsourcing-s-alphabet-soup> (accessed 04/1/2013).

¹⁵ TT Electronics, “About Us,” <http://www.ttelectronics.com/about/>.

¹⁶ Early Electronic Television, “The 1939 New York World’s Fair,” http://www.earlytelevision.org/worlds_fair.html.

¹⁷ Early Television Museum, “Early Color Television,” <http://www.earlytelevision.org/color.html> and Mitchell Stephens, “History of Television,” <http://www.nyu.edu/classes/stephens/History%20of%20Television%20page.htm>; Kathleen McGinn, “The Story of Color Television,” *U.S. 1 Newspaper*, November 14, 2001, <http://161.58.97.168/200111/11114c01.html>.

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computers in the early to mid-1970s”¹⁸ with the release of the Apple I and the Sol-20, “the first computers with factory video outputs in 1976.”¹⁹ The CRT industry steadily grew through the end of the 20th century and in 1999, global CRT monitor sales peaked at almost \$20 billion.²⁰

16. Over time alternative display technologies emerged and by the end of the alleged conspiracy period, largely supplanted CRTs. These alternatives included TFT-LCDs and Plasma Display Panels (PDPs).²¹ TFT-LCDs first emerged in the 1960s and began to be implemented in small portable devices such as digital watches and pocket calculators.²² TFT-LCD technology quickly came to dominate the portable computer market because TFT-LCDs consume relatively little power and had a distinct advantage in terms of size and weight.²³ Technological advances allowed them to be manufactured in bigger sizes and to compete with CRT televisions and desktop computer monitors as early as the 1980s, but they remained relatively expensive for many years.²⁴
17. PDPs were also much thinner than CRT displays, at only 15-20 cm thick.²⁵ PDPs initially had an advantage over TFT-LCDs in being able to display high image-quality

¹⁸ Benj Edwards, “A Brief History of Computer Displays: The Glass Teletype,” *PCWorld*, November 1, 2010, http://www.pcworld.com/article/209224/a_brief_history_of_computer_displays.html.

¹⁹ Benj Edwards, “A Brief History of Computer Displays: Composite Video Out,” *PCWorld*, November 1, 2010, http://www.pcworld.com/article/209224/a_brief_history_of_computer_displays.html.

²⁰ PC TechGuide, “CRT Monitors,” at 2, <http://www.pctechguide.com/06crtmon.htm>.

²¹ Several other technologies have emerged, including Organic Light Emitting Diodes (OLEDs), Digital Light Processing (DLP), Field Emission Displays (FEDs) and Electronic Ink Displays. However, these are far less common. See J. Gurki and L. M. Quach, “Display Technology Overview,” *Lytica White Paper*, July 1, 2005, 1-37 at 33.

²² Benj Edwards, “A Brief History of Computer Displays: The Early LCD Era,” *PCWorld*, November 1, 2010, http://www.pcworld.com/article/209224/a_brief_history_of_computer_displays.html.

²³ Pablo Fuchs, “Scales are tilting in favour of TFT-LCDs,” *Computer Dealer News*, 18(15) (August 16, 2002): 19-20.

²⁴ *Ibid.*

²⁵ J. Gurki and L. M. Quach, “Display Technology Overview,” *Lytica White Paper*, July 1, 2005, 1-37, 26.

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at large sizes.²⁶ However, PDPs were almost exclusively available in sizes above 34," consumed more power than both CRT and TFT-LCDs and had exceedingly fragile screens.²⁷

18. Over time, as TFT-LCD technology improved and became cheaper, CRT sales began to wane.²⁸ In 2005, even as overall TV sales grew dramatically, sales of "more analog-oriented, direct-view CRT TVs" were declining.²⁹ In December 2005, Matsushita Electric Ind. Co. Ltd. announced that it would shut down two of its CRT-producing subsidiaries.³⁰ In July 2006, Panasonic Taiwan announced a plan to completely stop manufacturing CRT TVs within three years.³¹ In the fourth quarter of 2007, shipments of TFT-LCD TVs surpassed CRT TV shipments for the first time in the history of CRTs.³² In early 2008, Chunghwa Picture Tubes, Ltd. announced the shutdown of its CRT plants in mainland China.³³
19. In December 2006, it came to light that there had been a price-fixing conspiracy involving the major TFT-LCD manufacturers.³⁴ In October 2001, during the period in which the TFT-LCD conspiracy was admitted to be in force, Samsung, Chunghwa

²⁶ Leanne Pitchford, "Plasma Display Panels," *Coalition for Plasma Science*, 2004, 2.

²⁷ J. Gurki and L. M. Quach, "Display Technology Overview," *Lyrica White Paper*, July 1, 2005, 1-37, 26.

²⁸ See Paul Semenza "A New Chapter for the Display Market," *Information Display*, 2010, 1-2, <http://www.sidmembers.org/online/article.cfm?year=2010&issue=05&file=art8> and Pablo Fuchs, "Scales are tilting in favour of TFT-LCDs," *Computer Dealer News*, 18(15) (August 16, 2002), 19-20.

²⁹ Greg Tarr, "Manufacturers Expecting Banner TV Year," *Twice*, July 11, 2005.

³⁰ EE Times-Asia, "MTPD to stop operations of two subsidiaries," December 2, 2005, http://www.eetasia.com/ART_8800398649_480700_NT_fdae735c.HTM.

³¹ Emily Chuang, "Panasonic Taiwan to halt CRT TV production in 2-3 years," *DigiTimes*, July 31, 2006, <http://www.digitimes.com/news/a20060731VL201.html>.

³² Darren Murph, "Worldwide TFT-LCD TV shipments surpass CRTs for first time ever," *Engadget*, February 19, 2008.

³³ EMSNow, "CPT closes CRT/CDT production lines in Mainland China," February 6, 2008, <http://www.emsnow.com/newsarchives/archivedetails.cfm?ID=21702>.

³⁴ Reuters, "LCD price-fixing investigation grows," December 12, 2006, http://news.cnet.com/LCD-price-fixing-investigation-grows/2100-1047_3-6142839.html; Neowin Forums, "LCD Price-Fixing Probe Widens," December 12, 2006, <http://www.neowin.net/forum/topic/520907-lcd-price-fixing-probe-widens/>.

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and LG expressed satisfaction at the “recent successful rise in TFT retail prices, believing that it could help to halt further price drops in the downturn market for tubes.”³⁵ In the effort to preserve their market position, CRT producers clearly benefited from higher TFT-LCD prices.³⁶

E. The Alleged Conspiracy’s Control over Sales

20. The Defendants and co-conspirators in this case accounted for the vast majority of industry sales. As shown in Figure 4, the combined market share of the Defendants and co-conspirators from 2000-2006 was close to 90 percent. During this period, the Defendants and co-conspirators held about 80 - 100 percent of the industry’s capacity.^{37,38}

³⁵ CHU00028589.01E-CHU0028590.02E at 28589.01E.

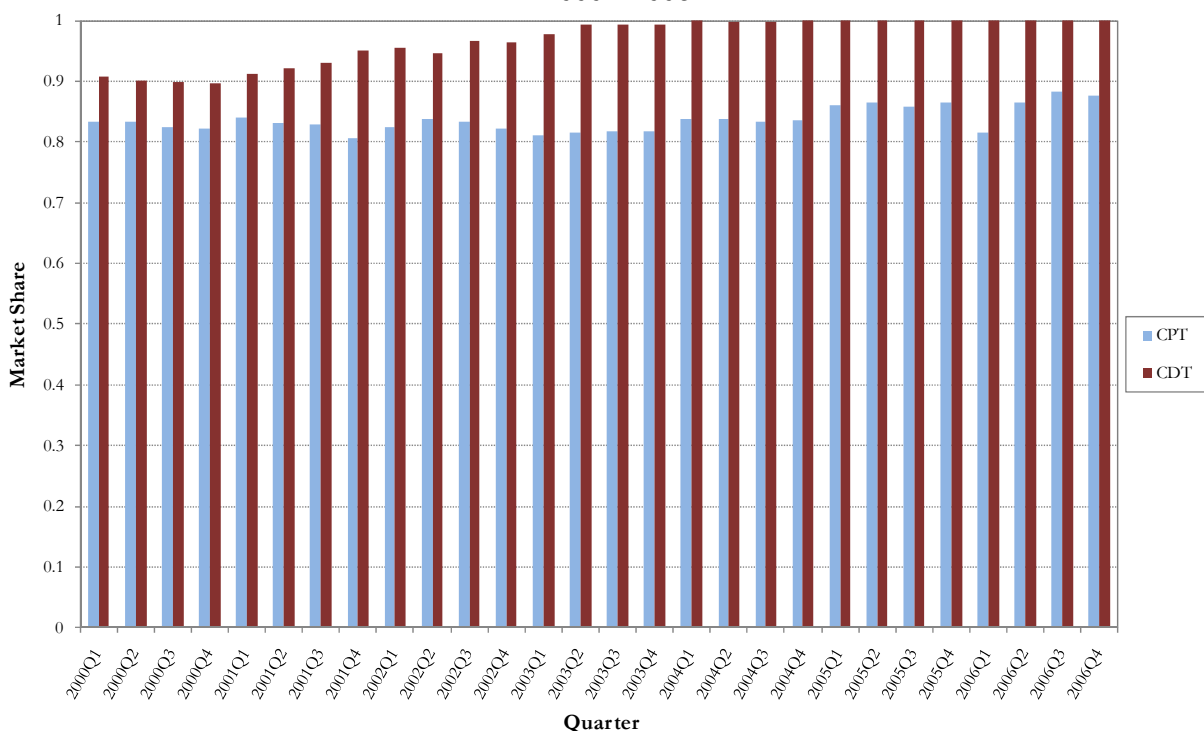
³⁶ CHU00031174.01E - CHU00031175.02E at 1174.01E-1175.01E.

³⁷ See PHLP-CRT-014823.xls; MTPD-0575968.xls; MTPD-0468631.xls; LGE00081653.xls; BMCC-CRT000057539.xls; BMCC-CRT000006384.xls.

³⁸ Defendants’ and co-conspirators’ market share of CDT sales between 1996 and 1999 averaged 89 percent.

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Figure 4
Defendant and Co-Conspirator Share of Global CRT Production
2000 - 2006



Source: MTPD-0416090; SDCRT-0201291; CHU00071226; CHU00154037-CHU00154420 at 154389-90; CHU00281352-CHU00281923 at 281644-45; CHWA00062147-CHWA00062569 at 62427; CHWA00088192-CHWA00088762 at 88484; CHWA00106460-CHWA00106757 at 106730.

21. This high degree of control over sales is significant from the standpoint of the impact of the alleged conspiracy. If the participants can collectively coordinate pricing decisions, their control over total industry output will translate that coordination into industry wide price effects. Moreover, their high degree of control also simplifies their coordination issues because there is little by way of an outside competitive presence to exert pressure on the alleged conspiracy's coordination efforts.

IV. Pricing Patterns among CRT Buyers

22. A simple comparison of CRT transaction prices across buyers, without accounting in any way for product differences, would naturally reveal substantial variability. Price variability is sometimes advanced as evidence that a conspiracy was ineffective in enforcing its prices or that its impact was selectively distributed across buyers. However, price variation often just reflects factors like differences in product characteristics, seller reputation or purchase quantities that are unrelated to the

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impact of the conspiracy. I have analyzed the pricing data for purposes of identifying variability associated with factors of this sort. I find that the vast majority of observed pricing variability is related to these non-conspiracy factors.

23. In this regard, I conducted a series of “hedonic” regressions on actual CRT transaction prices. In essence, a hedonic regression is used to identify relationships between product prices and product, seller or customer characteristics (the “explanatory variables”).³⁹ To reflect product characteristics, I included information from the transaction data regarding the CRT’s size, whether it was widescreen, whether ITC or bare, transaction quantity, and an indicator for the brand. I performed a separate hedonic regression each calendar quarter both for CDT and CPT prices using the actual transaction prices within that quarter.⁴⁰
24. One of the statistics produced by regression analysis is known as the R-Squared. In essence, it represents the percentage of the variation in the variable that is the subject of the analysis (in this case, CRT prices) that can be explained statistically by the explanatory variables (CRT product, transaction and seller characteristics). The R-Squared ranges in value from 0 to 1. Zero means the explanatory variables didn’t account for any of the variation, one means they accounted for all of it. In this context, the R-Squared reveals the percentage of the CRT customer price variation each quarter that can be explained by the non-conspiratorial factors included in the regression.⁴¹
25. In Figure 5 below, I plot (as a series of vertical bars over time) the R-Squared for each of the 104 quarterly regressions associated with the two types of CRTs over the 13 years covered by the analysis. The median R-squared for the CPT hedonic

³⁹ See. e.g., S. Rosen, “Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition,” *The Journal of Political Economy*, 82-1 (1974): 34-55.

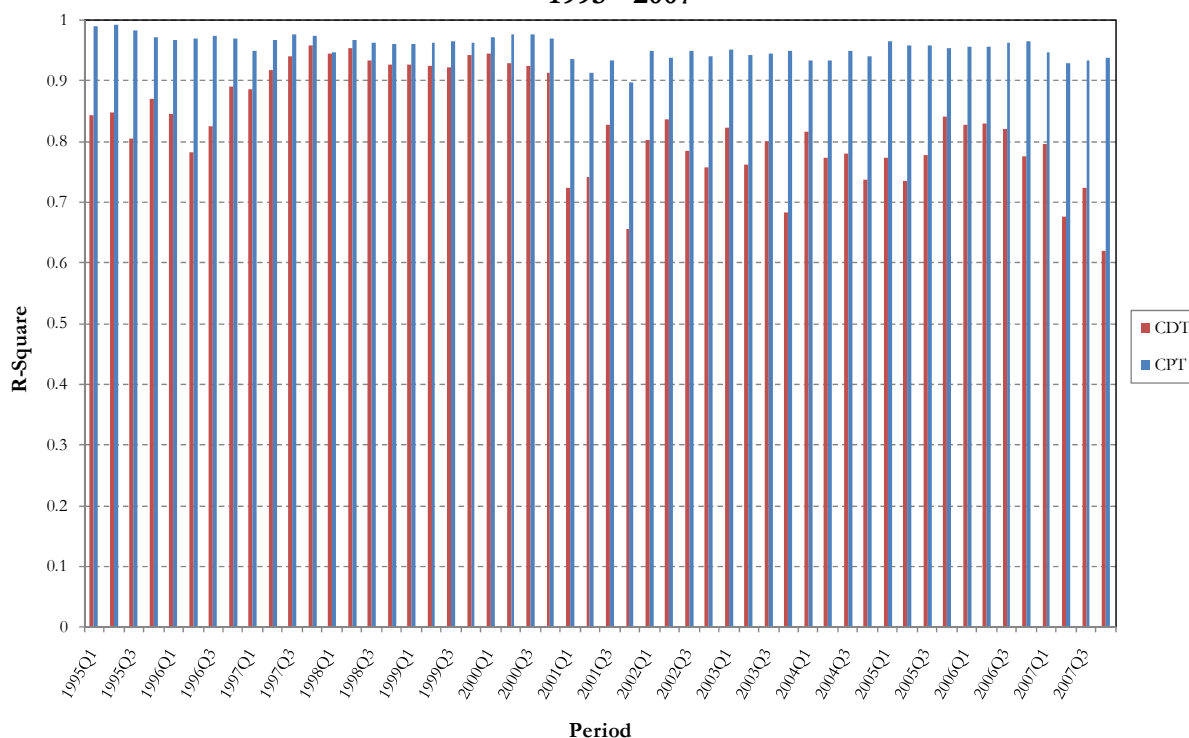
⁴⁰ I have estimated separate hedonic relationships for the prices and associated product characteristics within each quarter. This allows for enough data within each regression to meaningfully assess the underlying relationships while, at the same time, limiting the degree to which changes over time in the underlying hedonic relationships may confound the estimation.

⁴¹ In this regard, one cannot conclude that the unexplained variation (one minus the R-Squared) is the result of the alleged conspiracy. It may reflect either the effects of the alleged conspiracy or other non-conspiratorial factors excluded from the model.

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regressions was 96 percent and 82 percent for CDTs. The R-Squared exceeded 0.7 in all but four of the 104 results shown in Figure 5. In short, the vast majority of the variability associated with prices can be explained statistically by factors other than the conspiracy.

Figure 5
R-Squared of Quarterly Hedonic Regressions
1995 - 2007



Note: Based on hedonic regressions of Log(Gross Transaction Price) on size dummies, widescreen indicator, itc/bare, manufacturer dummies, and log(transaction volume). Hedonic regressions conducted for CDT and CPT products separately for each quarter in the period 1995Q1 - 2007Q4.

Source: CRT Manufacturers' Sales Data; Hedonic Regressions.

V. The Alleged Conspiracy

26. In this section, I describe the organization and operation of the conspiracy as alleged by Plaintiffs, along with the manner in which the participants are alleged to have communicated with each other. In doing so, I describe some of the evidence developed by Plaintiffs in support of their allegations. As an economic matter, this evidence is indicative of anticompetitive activity that is broad in scope and multi-faceted in the manner in which it affects firm behavior. It supports my opinion that the impact of the alleged conspiracy would be felt broadly by CRT buyers.

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A. Organization and Communication

27. The overarching goal of the alleged conspiracy was to maintain and elevate CRT prices.⁴² The collusive efforts among Defendants and co-conspirators began as early as March 1995.⁴³ Chunghwa, LG Electronics, Samsung, Philips and Orion held “group” meetings in Taiwan, South Korea, Thailand, Japan, Malaysia, Indonesia and Singapore to exchange information, and agree on CRT prices, production levels and customer allocation. Attendees of group meetings also met with non-attending co-conspirators—including Hitachi, Toshiba and Panasonic—to apprise them of information discussed and agreements reached at the group meetings.
28. From 1997 through 2006, there were hundreds of “Glass Meetings” which took place in Taiwan, South Korea, Singapore, Japan, Indonesia, Thailand and Malaysia.⁴⁴ These meetings had a hierarchical structure involving three levels of employees.⁴⁵
 - i. “Top Meetings” were attended by CEOs, Presidents and Vice Presidents and typically occurred quarterly. These meetings focused on long term agreements and enforcement of the alleged conspiracy.⁴⁶

⁴² “It can be understood that one might reduce their price in order to sell, however if the price drops too low, it will not help to increase sales, but instead cause each maker to keep cutting the price and bleed.” CHU00028396.01E- CHU00028397E at 28396.01E. See also CHU00028752.01E-CHU00028754E at 8753.01E and CHU00030787.01E-CHU00030794E at 791.02E, “In view of the market situation, July’s number of non-workdays should be higher than the average number over the April-June period, to demonstrate each maker’s commitment to safeguarding the price.”

⁴³ See Complaint, 2.

⁴⁴ See e.g., Deposition of Chih Chun-Liu Vol. 2 (Chunghwa), February 20, 2013 at 367:17-22, “Q. Did all the group meetings occur in Taiwan, sir? A. No. Q. Where did they occur? A. In Taiwan, Korea, Japan, Malaysia, Thailand, Indonesia.” See also SDCRT-0086672E- SDCRT-0086674E at 672E and Complaint, 32.

⁴⁵ For example, as described by one Defendant employee, “To my recollection there were top management meetings and management meetings, and there were also working level meetings.” Deposition of Jaemin Lee Vol. 1 (Samsung), June 6, 2012 at 31:25-32:2. The importance of involving employees from different levels has been identified in academic literature. See, for example, Levenstein, M. and V. Suslow, “What Determines Conspiracy Success?,” *Journal of Economic Literature*, 44 (March 2006): 43-95, talking about successful conspiracies “[t]hey develop an elaborate internal hierarchy that allows communication on various levels (executive and middle-management) not only to provide flexibility in the details of the agreement, but to build trust as well.”

⁴⁶ See e.g., SDCRT-0086593E - SDCRT-0086596E at 6593E-6594E.

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- ii. “Management Meetings” were attended by high-level sales executives with pricing authority and took place monthly.⁴⁷ These meetings focused on pricing and output agreements and the implementation of the agreements entered into at the Top Meetings.⁴⁸
 - iii. “Working Level Meetings” were attended by marketing and lower-level sales personnel and took place weekly or monthly.⁴⁹ The attendees exchanged information on sales and production activities, pricing policies and other topics, then transferred this information to superior members of their company, who had pricing authority. These meetings were often held in preparation for the higher level meetings.
29. In preparation for Glass Meetings, Defendants and co-conspirators often shared information about inventories, production, sales and exports.⁵⁰ In the meetings themselves, Defendants and co-conspirators provided information regarding sales, capacity, production line status, pricing, and demand forecasts.⁵¹ They reviewed information regarding actual market shares and discussed agreements regarding market shares going forward.⁵² They also discussed demand and supply conditions in connection with a “Market Update” for CRTs. They discussed market trends for both CRTs⁵³ and TFT-LCDs.⁵⁴ Suspected violations of the alleged conspiracy agreements

⁴⁷ “To my recollection, [] the management meeting was once a month.” Deposition of Jaemin Lee Vol. 1 (Samsung), June 6, 2012 at 32:24-33:1.

⁴⁸ See e.g., SDCRT-0086593E - SDCRT-0086596E at 6593E-6594E.

⁴⁹ “Management meeting was once a month, and working level meeting was so that we could prepare for the management meeting. So working level meetings were held on the same day as the management meetings or one day before the management meetings.” Deposition of Jaemin Lee Vol. 1 (Samsung), June 6, 2012 at 33:1-5.

⁵⁰ Ibid. See also Complaint, 32.

⁵¹ See Deposition of Jaemin Lee Vol. 1 (Samsung), June 6, 2012 at 34:1-37:13; CHU00660426-CHU00660435; SDCRT-0087934E - SDCRT-0087937E at 7936E; SDCRT-0086649E-SDCRT-0086651E; CHU00031111.01E- CHU00031112.02E; CHU00028685E-CHU00028686E.

⁵² CHU00647932 - CHU00647943 at 7935 and 7941-7942; CHU00660539 - CHU00660548 at 0545-0546; SDCRT-0088763 - SDCRT-0088772 at 8767; SDCRT-0088846 - SDCRT-0088851 at 8848.

⁵³ CHU00660383 - CHU00660394 at 660386 - 660390.

⁵⁴ CHU00647932 - CHU00647943 at 647937-647938.

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were openly discussed among the participants, along with threats to raid the violator's customer base.⁵⁵ Additionally, the conspirators jointly developed customer explanations for CRT price increases, as well as public statements on supply, capacity and demand for CRTs designed to conceal the effects of the conspiracy.⁵⁶

30. There were also discussions on "How to keep the Price"⁵⁷ or "Price Management." A typical meeting would end with planning for future meetings and "All Other Business"⁵⁸ (which often included discussions about contacting and informing manufacturers not in attendance regarding the agreements reached during the meeting). There was discussion regarding the importance of keeping the industry meetings "confidential considering the international regulation of antitrust laws."⁵⁹
31. There were regional meetings occurring simultaneously with the Glass Meetings, including monthly meetings of Chinese manufacturers to report Glass Meeting decisions. Irico, Hitachi Shenzhen, Samsung SDI Shenzhen, Samsung SDI Tianjin, and Chunghwa participated in these meetings.⁶⁰ There were meetings in Europe that included European manufacturers,⁶¹ such as Thomson and Daewoo-Orion Societe

⁵⁵ Deposition of Chih Chun-Liu Vol. 2 (Chunghwa), February 20, 2013 at 368:1-369:16. See also Deposition of Jaemin Lee Vol. 1 (Samsung), June 6, 2012 at 40:9-17, "Q [] Based on your attendance at these meetings, you were aware that there was an agreement regarding an auditing process for the companies to audit and check regarding the information that the competitors were providing at these glass meetings? [] A: Yes, discussions on that did occur." See also SDCRT_0087953E- SDCRT_0087962E at 953; CHU00028297-CHU00028298 at 8297E; CHU00030698 - CHU00030700 at 0699.01E.

⁵⁶ See CHU00028763E- CHU00028767E at 763E "SDD published the news about reducing production by 20% in Korean newspapers, see attached;" CHU00030701.01E-CHU00030704.02E at 30702.01E, "Mr. David indicated that recently the newspapers and media have repeatedly published information about the expected rise of CDT and Monitor prices. It is quite helpful for our CDT and Monitor makers to raise the prices even further in the future."

⁵⁷ CHU00660487- CHU00660500 at 660497: 20% capacity shutdown and Weekly Quantity and Price monitoring; CHU00030701.01E-CHU00030704.02E at 30702.02E and 30704.01E.

⁵⁸ CHU00660487-CHU00660500 at 500; CHU00660515-CHU00660522 at 522.

⁵⁹ SDCRT-0086672E-SDCRT-0086674E at 86672E; CHU00647932-CHU00647943 at 7943; CHU00031176.01E- CHU00031176.02E at 31176.02E referring to the importance of keeping the meetings secret; CHU00578883.01E-CHU00578885E at 8883.01E.

⁶⁰ SDCRT-0086672E- SDCRT-0086674E at 672E.

⁶¹ For example, an email from April 2003 discusses a meeting of the "Europe CPT companies" LPD, Thomson, and SDI. LPD and Thomson both discuss decreasing demand and line stoppages. See

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Anonyme (DOSA). In June 2002, Thomson, DOSA, SDI, and LPD held a meeting in Rome. The participants in these meetings exchanged sales information, capacity changes, production forecasts, and market demand forecasts.⁶² In addition, there were “Green Meetings,” attended by high-level management, which took place on golf courses.⁶³ Finally, there were many bilateral meetings involving various Defendants and co-conspirators to communicate agreements regarding CRT pricing and output to members of the conspiracy who were unable to attend Glass Meetings. At these meetings, sales and marketing employees exchanged information regarding sales orders, customers, pricing and production levels.⁶⁴

32. SDI and Mitsubishi held several meetings to discuss the CRT industry. Mr. Jaemin Lee of SDI testified that, between 1998 and 2005, he met with representatives from Mitsubishi multiple times to discuss the CRT industry. Documents indicate that these meetings were held to discuss “sales projections, pricing and price forecasts, production, [and] LPD’s manufacturing operations.”⁶⁵ For example, SDI held a meeting with Mitsubishi in 2003, “re line closure in Mexico and business negotiations for 17” and 21” CDTs.”⁶⁶ In March of 2004, they met in Korea to discuss “production, customers, and pricing of 19” and 22” CRTs.”⁶⁷ In December 1995, Mitsubishi and Chunghwa held a meeting to exchange information about the market. Mitsubishi revealed that it had ceased production of 14 and 15 inch CDTs in Japan and was producing only 17 and 21 inch CDTs in its factories. Mitsubishi also

SDCRT-0006903E. See also SDCRT-0088635 (Meeting in December 2003).

⁶² SDCRT-0087705E–7E

⁶³ CHU00021268.01E- CHU00021271E at 268.01, Set up itinerary for 3/5 Glass Meeting and 3/6 Green Meeting; CHU00030916.01E- CHU00030916.02E at 30916.02E.

⁶⁴ See CHU00028968.01E-CHU00028969E; CHU00028647.01E- CHU00028647.02E; CHU00028254.01E-CHU00028256E.

⁶⁵ Deposition of Jaemin Lee (Samsung), July 24, 2013 at 60:16-24 and 61:22-13. See also SDCRT-0006041E “Report on the Mitsubishi Meeting Results.”

⁶⁶ Samsung SDI Defendants’ Supplemental Responses to Direct Purchaser Plaintiffs’ First Set of Interrogatories, NOS. 4 and 5, October 17, 2011 at 56.

⁶⁷ Ibid. at 64.

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disclosed its estimated production numbers for 1995, 1996, and 1997.⁶⁸ A similar meeting occurred between Mitsubishi and Chunghwa in November 1996. Mr. Ishii of Mitsubishi visited Chunghwa to exchange competitively sensitive information. Mitsubishi revealed information about its current and future CRT production.⁶⁹ Chunghwa and Mitsubishi met again in December 1998 and discussed both CDTs and CPTs. Mitsubishi shared its plans to stop CPT production in Japan. Mitsubishi reported its CDT production volumes for 1997 and 1998 and its projections for 1999. It also provided detailed information about its production lines and current and future capacity plans.⁷⁰

33. A Mitsubishi document, apparently from 2003 or 2004, described meetings between Mitsubishi and executives with SDI, LPD, and SEC.⁷¹ These meetings discussed the firms' demand forecasts, production plans, profits, costs, and future prices of a range of CRT types and sizes. The meetings also discussed justifications to be given to customers for CRT price increases. The view of the Mitsubishi employee was that "the CRT manufactures will have to risk everything to survive."
34. In 1999, Thomson and Samsung met at Thomson's headquarters in France. During this gathering, the two firms exchanged information on production and market supply of CPTs. The notes describe a price agreement between Samsung and Thomson for 20, 21, and 25 inch CPTs and list Thomson's quarter by quarter pricing plan for large-sized models in 2000.⁷² Thomson also exchanged information with Panasonic in August 2002. An email from Shinichi Iwamoto of Matsushita Display Devices America (MDDA) [Panasonic], titled "Information Exchange with Thomson," reports information on Thomson's production and pricing strategies.⁷³ On November 15, 2002, SDI met with Thomson at its headquarters and exchanged

⁶⁸ CHU00028558E

⁶⁹ CHU00028548E

⁷⁰ CHU00028532E

⁷¹ ME00131622E

⁷² SDCRT-0086256-7004 at 6511

⁷³ MTPD-0223790E

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information on sales, capacity, Thomson's changing production technology for 29 inch and 32 inch CPTs, market demand for CPTs in North America, Europe, and Asia, and Thomson's cost reduction efforts.⁷⁴ An SDI email titled "Exchange of Information on Thomson CRT" from 2003 describes capacity changes at a Thomson plant and reports Thomson said that "there will be no additional price cutting."⁷⁵ In 2003 Thomson met in the U.S. with representatives of MDDA and Toshiba Display Devices America (TDDA). Thomson provided TDDA and MDDA with CPT sales and inventory information, CPT capacity and production information, and described interactions with specific customers.⁷⁶

35. The conspirators also communicated plans and information by email. For example, in 2001 a Philips employee received a report by email on Thomson's production of 36 inch and 38 inch CRTs as well as SDI's current and planned production of 19/20 and 25/27 inch CRTs. The email also stated that, "Both SDI and Thomson intend to hold pricing until Q3 2001."⁷⁷
36. The scope, frequency and depth (both as an informational and organizational matter) of these meetings is economically significant from the standpoint of the likely impact of the alleged conspiracy. It suggests extensive communication and coordination regarding the participants' activities. This would facilitate close alignment among the participants with the goals of the alleged conspiracy and broad impact on prices. In addition, several market research firms published prices and revenue figures on a regular basis. DisplaySearch, iSuppli, WitsView, and DisplayBank were publicly available sources of price information for the CRT industry. The conspirators routinely tracked this information and discussed it during their meetings.⁷⁸ Indeed,

⁷⁴ SDCRT-0006632E-33E

⁷⁵ SDCRT-0007239_CT

⁷⁶ MTPD-0576483E

⁷⁷ PHLP-CRT-089918

⁷⁸ See Deposition of Roger De Moor Vol. 1 (Philips), July 31, 2012 at 70:19-71:1, "Q. Do you know what his responsibilities were? A. Collect information about market trends, working with DisplaySearch, and presenting to management the information on which they could base their plans." See also the Deposition of Yun Seok Lee (LGE), July 11, 2012 at 78:8-11 and Deposition of William Allen Whalen Vol. 1 (Hitachi), August 23, 2012 at 110:24-111:13.

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one of the first points of discussion during a typical Glass Meeting was market trends and these sources were often cited.⁷⁹

B. Collusive Activities Directed Towards Output Restraint

37. According to Plaintiffs, the alleged conspiracy participants reached agreements regarding capacity and output. As an economic matter, there is a well-recognized relationship between prices on the one hand and output and capacity on the other.⁸⁰ These agreements included “line stoppage plans”⁸¹ involving temporary⁸² or, in some cases, permanent closures of production lines and reduced number of work days.⁸³ An August 1998 meeting document recorded, “agreed to reduce to 3.9 million units, reached a 25% prod. reduction... companies agreed to reduce production by further 4% in order to maintain the price 17 inch screens at US\$93.”⁸⁴ In some cases, inspectors apparently verified line shutdowns that were part of these agreements.⁸⁵ In a May 1999 Glass Meeting, the conspirators employees agreed that:

⁷⁹ CHU00014230.01E- CHU00014231.02E at 14230.01E and CHU00031111.01E-CHU00031112.02E at 31112.02E.

⁸⁰ See e.g., R.C. Marshall and L. M. Marx, *The Economics of Collusion*, Cambridge: The MIT Press, 2012): 118-119; C. Davidson and R. Deneckere, “Excess Capacity and Collusion,” *International Economic Review* 31- 3 (Aug., 1990): 521-541; R.W. Staiger and F. A. Wolak, “Collusive Pricing with Capacity Constraints in the Presence of Demand Uncertainty,” *The RAND Journal of Economics* 23-2 (Summer, 1992): 203-220. Note that even if conspiracy price discipline breaks down, the reduced industry output will continue to have its industry-wide price effect.

⁸¹ SDCRT-0086593E -SDCRT-0086596E at 86593E at 86593E; CHU00030899.01E-CHU00030903E at 30902E; CHU00030888.01E- CHU00030893.02E at 30888.02E; CHU00030701.01E- CHU00030704.02E at 30702.02E.

⁸² SDCRT-0086632E - SDCRT-0086633E at 6632E; CHU00030787.01E- CHU00030794E at 30787.01E and 30791.02E-30793E; CHU00031111.01E- CHU00031112.02E at 31112.02E; SDCRT-0086649E-SDCRT-0086651E at 86650E-86651E.

⁸³ See CHU00028768.01E- CHU00028770E at 28768.01E; SDCRT-0086632E-SDCRT-0086633E at 86632E; SDCRT-0086641E- SDCRT-0086645E at 86642E and 86645E; CHU00030787.01E-CHU00030794E at 30791.02E.

⁸⁴ SDCRT-0086419E-SDCRT-0086420E at 419E.

⁸⁵ SDCRT-0086593E-SDCRT-0086596E at 86596E; SDCRT-0086641E-SDCRT-0086645E at 86643E; CHU00031075.01E -CHU00031087E at 75.01E; SDCRT-0091599E - SDCRT-0091604E at 1602E.

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17" CDT production will stop for 5 days (25 operating days) to adjust the actual production volume in order to maintain the price level.⁸⁶

38. A November 2000 document recorded, “market demand in November is worse compared to October, in order to maintain the stability of pricing, a stricter control of the output volume is needed.”⁸⁷ In market updates and reviews later that year the conspirators noted that:

[T]his year the 17" [CDT] price has been able to be keep at a price no less than \$90 because of the glass meetings,⁸⁸ and

Price-up trend in European & American market thanks to capacity reduction in Asia.⁸⁹

39. Other documents record production controls aimed at stabilizing prices.⁹⁰ For example in 2007, CPT manufacturers in China including “Panasonic Beijing, Samsung Shenzhen [SDI], Seg-Hitachi, Thomson, LG Changsha, Philips Nanjing, Shanghai Yongxin [Novel], and IRICO,” announced that “the entire CRT TV [CPT] industry stopped production for 20 days.”⁹¹

⁸⁶ Samsung SDI, May 1999, Report on the CDT management meeting results (May of ‘99), SDCRT-0086632E-SDCRT-0086633E at 6632E.

⁸⁷ CHU00031075.01E- CHU00031087E at 076.01.

⁸⁸ CHU00030888E- CHU00030893.02E at 889.01E.

⁸⁹ CHU00030899.01E- CHU00030903E at 902E.

⁹⁰ SDCRT-0086632E - SDCRT-0086633E at 86632E; SDCRT-0086419 - SDCRT-0086420 at 419E; CHU00031075 - CHU00031087 at 31076.01E; CHU00022696.01E- CHU00022696.02E at 22696.01E; CHU00660549 - CHU00660560 at 557-559; CHU00014200 - CHU00014201E at 14201E. The cartel members also exchanged production and capacity information useful for coordinating plans, e.g., CHU00028760.01E-2E at 61E-2E reports SDI, LG, Orion, Hitachi, Toshiba, Panasonic, Mitsubishi, Chunghwa, and Philips.

⁹¹ CHWA00226236 - CHWA00226269 at 44.

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40. Plaintiffs also allege that the conspiracy explicitly allocated market shares and customers. The conspirators reached agreements regarding output in the form of “Capacity Control Guideline[s]” and “M/S Allocation” (i.e. market share allocation).⁹² One way this was done was that the alleged conspiracy divided the market as a whole by targeting specific market shares of sales for individual conspiracy members.⁹³ Additionally, they discussed allocating exclusive rights to major customers or large shares of certain major customers amongst members.⁹⁴ For instance, in connection with CDT customer AOC, the conspirators discussed the following:

In addition, with regard to each maker’s share with A.O.C., it was reviewed and set as follows: [Chunghwa]: 50% PH: 20% SDD/ORION: 30% (SDD and Orion will review as to how to share that 30%).⁹⁵

41. In another example from a CPT meeting, conspirators discussed:

With Thai-CRT/TEDI’s promise that they would not grab Chunghwa Picture Tube’s M/S orders (maintained at the original 50%).⁹⁶

42. Various documents obtained through discovery in this case reference meetings at which Defendants and co-conspirators exchanged plans and information related to

⁹² CHU00647932 - CHU00647943 at 7935, 7939 and 7941-7942; CHU00608095- CHU00608105 at 608100 and 608104; SDCRT-0088846- SDCRT-0088851 at 88848-88849; SDCRT-0088763- SDCRT-0088772 at 8767. See also Deposition of Jaemin Lee Vol. 2 (Samsung), June 7, 2012 at 248:15-249:2, “And the plan for 2004 indicates the figures that each company proposed as what they would like to do. And when you get the percentage in total volume and divide by a hundred, that will be the MS here.”

⁹³ Several documents report a comparison of “Agreed” vs. “Actual” market shares. See for instance SDCRT-0088763- SDCRT-0088772 at 8767; SDCRT-0088846- SDCRT-0088851 at 8848; CHU00029259 - CHU00029261 at 9261.01E; CHU00647932- CHU00647943 at 7935.

⁹⁴ CHU00660561 - CHU00660574 at 0569; CHU00660539 - CHU00660548 at 0545-0546; SDCRT-0091687 - SDCRT-0091691 at 1689E.

⁹⁵ CHU00030763E - CHU00030765E at 0764E-0765E.

⁹⁶ CHU00029259.01E - CHU00029261.02E at 9261.01E.

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CRT production.⁹⁷ For example, documents show that in 2003, the conspirators conducted at least 18 meetings in which they discussed various ways of reducing the current CDT production and 7 meetings discussing reduction of CPT production.⁹⁸ Figure 6 summarizes the number of meetings between conspirators relating to production plans and information.⁹⁹

Figure 6: Meetings Referencing Production Restraints

Product Type	Capacity Control Topic	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(1)+(2)+...+(12) (13)
CDT	Line Shutdown	-	-	-	1	-	1	4	2	16	9	8	-	41
	Line Reduction	-	-	4	4	14	10	9	-	6	2	1	-	50
	Information Exchange	-	4	7	7	14	8	4	6	7	2	4	-	63
	Total Documents ¹	-	4	11	9	24	13	9	7	18	12	9	-	116
CPT	Line Shutdown	-	-	-	-	-	-	1	-	-	-	-	-	1
	Line Reduction	-	-	-	4	3	1	4	1	1	-	1	-	15
	Information Exchange	1	1	1	3	4	6	7	5	6	11	10	2	57
	Total Documents ¹	1	1	1	5	6	7	9	6	7	11	11	2	67

¹ Total Documents refers to the total number of documents referencing capacity control in a year.

Source: Conspiracy documents.

C. Price Targeting

43. The participants in the conspiracy agreed at various times through the meetings and other communication described above to “bottom prices,”¹⁰⁰ price increases,¹⁰¹ price

⁹⁷ Given the prospects for other meetings to have occurred which are not documented in the discovery in this case, Figure 6 likely reflects a fraction of the total communication that occurred with respect to these topics.

⁹⁸ Appendix B lists these documents.

⁹⁹ Line shutdown refers to an apparent coordination and communication by manufacturers of plans for permanent closures of entire production lines. Line reduction refers to coordination and communication of plans for some kind of reduction in the output or capacity of a line that will remain in operation (e.g., the number of days a line runs in a month). “Information Exchange” includes the sharing of information on capacity or production capabilities between firms. This category includes the exchange by manufacturers of strategic information regarding their production capabilities, capacities or existing plans for line changes and shutdowns.

¹⁰⁰ For example see CHU00028768.01E- CHU00028770E at 28768.01E and 28770E, “Everyone shall persist in guarding the bottom line under a common understanding among the CDT industry...” and CHU00028725.01E- CHU00028727E at 28727E, “Guard Bottom Price. Do not lower prices to take other

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ranges,¹⁰² price guidelines,¹⁰³ internal transfer prices¹⁰⁴ and price differentials.¹⁰⁵ They also established “Pricing Policy” or a “New Price Guideline” (usually in the form of price floors or bottom prices).¹⁰⁶ Specific price guidelines were sometimes set for certain customers,¹⁰⁷ along with discounts for other “Major customer[s]” (typically \$1-\$2 less than prices for “all others”).¹⁰⁸ In doing so, Defendants and co-conspirators effectively established price targets at various points in time for the top-selling CRTs. Using Glass Meeting documents (contemporaneous meeting notes and documents prepared by Defendants and co-conspirators for use during the meetings), my staff compiled a data set containing price targets they were able to find.¹⁰⁹ In a

makers’ orders.” See also CHU00030787.01E- CHU00030794E at 30791.01 and 30793E; MTPD-0423675E- MTPD-0423677E at 423675E; SDCRT-0086416E- SDCRT-0086418E at 86416E; SDCRT-0086593E- SDCRT-0086596E at 86593; CHU00028752.01E-CHU00028754 at 28752.01E.

¹⁰¹ SDCRT-0086593E- SDCRT-0086596E at 86593E; CHU00030787.01E- CHU00030794E at 30791.01E; MTPD-0423651E at sheet 2; CHU00660681-CHU00660692 at 689; CHU00123358E- CHU00123361.02E at 358E; CHU00031249E- CHU00031252E at 31249.02E; CHU00030701.01E-CHU00030704.02E at 30701.02E. See also Deposition of Jaemin Lee Vol. 2 (Samsung), June 7, 2012 at 250:14-16 “My understanding is that the companies were saying well, let’s have a discussion on raising prices.”

¹⁰² CHU00028815E- CHU00028816E at 28816E; CHU00028666E-CHU00028667E at 28667E.

¹⁰³ CHU00036394E-CHU00036395.02E at 36395.01E; CHU00036408E-CHU00036409.02E at 36409.01E; CHU00036384E- CHU00036385E at 36384.02E; CHU00608095- CHU00608105 at 105; SDCRT-0087934E - SDCRT-0087937E at 7935E; CHU00031111.01E- CHU00031112.02E at 31112.01E.

¹⁰⁴ See SDCRT-0086641E- SDCRT-0086645E at 86641E, List 14” and 15” price to be applied as of August 1 with an internal price listed or gap stated; CHU0031174E-CHU00031175.02E at 31175.01E.

¹⁰⁵ SDCRT-0086632E - SDCRT-0086633E at 6633E; CHU00030787.01E-CHU00030794E at 30791.01E; CHU00028725.01E- CHU00028727E at 28727E; CHU0031174E-CHU00031175.02E at 31175.01E; CHU00029144.01E- CHU00029146.02E at 29144.02E-29146.01E which lists price conversions for if the models are ITC or Bare; SDCRT-0086662E- SDCRT-0086664E at 86662E “Honestly, LG is absolutely weaker than Samsung and Chunghwa, so LG cannot compete at the same price level.”

¹⁰⁶ SDCRT-0086512E - SDCRT-0086513E at 6512E-6513E; SDCRT-0086649E-SDCRT-0086651E at 86649E.

¹⁰⁷ SDCRT-0086512E - SDCRT-0086513E at 6512E-6513E; CHU00028687E- CHU00028688E at 28688E; CHU00029144.01E- CHU00029146.02E at 29144.02E-29146.01E.

¹⁰⁸ See CHU00028725.01E- CHU00028727E at 28727E; CHU00647932- CHU000647943 at 940; SDCRT-0086416E-SDCRT-0086418E at 86416E; CHU00031240.01E-CHU00031247E at 31242E; TAEC-CRT-00089968-TAEC-CRT-00089969 at 89968.

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number of instances, possible price targets could not be used because of incomplete information regarding the meeting date or the date of effectiveness. For these reasons, as well as the gaps that routinely occur in efforts to use historical documents to reconstruct behavior, I expect that this dataset understates the full extent of price targeting.

44. The target prices that we found through this effort involved a range of CRT types and sizes that accounted for the vast majority of CRT shipments. As shown in Figure 7, the share of shipments represented by the targeted CRTs was 90 percent for CPTs and 98 percent for CDTs. This means that price targeting, if effective in influencing actual prices just for the targeted CRTs, would have directly impacted products accounting for about 94 percent of CRT shipments during the Class Period. That result, by itself, goes a long way towards establishing the existence of broad impact on the part of the alleged conspiracy.
45. For each of the targeted products in Figure 7 below, multiple target prices were located. Generally, for a given product type and size, there were dozens of instances where a target price was agreed upon and communicated amongst the alleged conspiracy participants. The number of target prices found for CDTs ranged from 36 (for 19 inch) to 77 (for 15 inch); for CPTs, we found as few as 8 target prices (for 28 inch) and as many as 100 (for 14 inch).

¹⁰⁹ Where the target involved a range of prices, the minimum price was recorded. Prices that appeared simply to be the sharing of past price information were excluded. Prices for an ongoing month or quarter were included as targets when they were discussed in the first half of the month or quarter.

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Figure 7: Targeted CRT Products' Share of Shipments

Product Type	Size	Share of Shipments
(1)	(2)	(Percent)
1. CDT		
	14	11.45 %
	15	26.52
	17	53.55
	19	6.64
Total CDT		98.16 %
2. CPT		
	14	18.80 %
	15	3.95
	20	11.80
	21	30.60
	25	3.40
	28	2.14
	29	18.02
	32	1.49
Total CPT		90.19 %

Note: Sales of CRT products unidentified as CDT or CPT not included.
Sales of CRT products with missing size are also not included.
"Targeted Products" are CRTs for which target prices were found.

Source: CRT Manufacturers' Sales Data; Conspiracy Documents.

VI. The Impact of Price Targets

A. With Respect to Targeted CRTs

46. Based upon the continuing meetings and communication among the alleged participants in the conspiracy and the attention devoted to price targets during those meetings, I would expect that the price targeting process was effective, at least to some extent, in raising prices. It would be difficult as an economic matter to understand the continuing time and effort devoted to target prices if they operated to no avail. My expectations aside, I have analyzed the relationship between price targets and actual sales prices.

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47. First, I looked to see whether target prices and actual prices moved together—that is, whether higher than average price targets lined up with higher than average actual prices, etc. If the price target influences actual prices, even if they don't always match, one would expect to find that these prices moved together. Economists often look to correlation coefficients as a measure of the extent to which different economic variables move together. Correlation coefficients range in absolute value from 0 to 1. One is perfect correlation, zero indicates no correlation. I find that price targets and transaction price levels (the average transaction price for the targeted product) were highly correlated. The correlation coefficient is 0.98. Clearly, higher price targets were closely associated with higher actual prices.
48. As a second step in analyzing the relationship between target prices and transaction prices, I have employed regression analysis. For that purpose, I first calculated the quarterly shipment-weighted average actual CRT price for each customer, product type, size, and finish, for which I found a target price.¹¹⁰ I then estimated a regression model on those quarterly average prices using the previous quarter's actual price, and price targets (both in the current quarter and in the prior quarter and represented separately for CDTs and CPTs) as explanatory variables.¹¹¹ I also included a set of supply and demand factors (described below as part of my estimation of the cartel's overcharges on sales of CRTs) likely to have influenced actual prices.¹¹² Finally, I include fixed effects for customer-product type-size-finish categories. Figure 8 reports the results of this regression. The results reveal a positive and statistically strong relationship between target prices and actual prices, separate and apart from the effects of other market factors. The estimated coefficients are statistically significant at the 95 percent level.
49. In Figure 9 below, I show the results of target price regressions estimated separately for North American and non-North American sales. These results show that, with a

¹¹⁰ In regards to my use of average quarterly prices, I note that the price guidelines were primarily set at a quarterly level.

¹¹¹ By including both the current price target and the price target from the prior quarter, I allow for the possibility that the full effect of the target may take some time to manifest itself in actual prices.

¹¹² Namely, the price of glass, lagged quarterly CRT shipment volume, lagged quarterly LCD share, quadratic trend, production growth and unemployment rate of countries in G7, as well as fixed effects.

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high degree of statistical confidence, target prices developed pursuant to the conspiracy resulted in higher CRT prices both in North America and in the rest of the world.

Figure 8: Target Prices Influenced Actual Prices

Variable	Estimate	Clustered ⁹ St. Error	T-Value	P-Value
(1)	(2)	(3)	(4)	(5)
<i>Dependent Variable:</i>				
<u>Log(Actual Price)¹</u>				
Log Actual Price (-1)	0.190 *	0.101	1.881	0.063
Log Target Price (-1) * CDT	0.719 ***	0.102	7.029	0.000
Log Target Price (-1) * CPT	0.380 ***	0.108	3.533	0.001
DLog Target Price * CDT ²	0.653 ***	0.079	8.276	0.000
DLog Target Price * CPT	0.122 **	0.059	2.086	0.039
Log BLS Glass Price (-1) ³	0.419	0.267	1.568	0.120
DLog BLS Glass Price	0.177	0.248	0.712	0.478
Log BOK Glass Price (-1) ⁴	0.227 **	0.099	2.297	0.023
DLog BOK Glass Price	0.228 *	0.118	1.929	0.056
Log CRT Quantity (-1)	0.002	0.003	0.884	0.378
LCD/(LCD+CRT) Sales (-1) ⁵	0.245	0.161	1.523	0.131
LCD/(LCD+CRT) Sales (-1) ²	-0.016	0.124	-0.129	0.898
G7 Production Growth ⁶	-0.001	0.005	-0.129	0.897
G7 Unemployment Rate ⁷	-0.014	0.017	-0.819	0.415
Trend	0.002	0.001	1.229	0.222
Trend-square	0.000 ***	0.000	-2.970	0.004
Constant	-0.403	1.324	-0.304	0.762
Fixed Effects ⁸	YES			
R-Square	0.962			
Observations	5,898			

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

¹ Quarterly average transaction price weighted by quantity for each manufacturer, customer, product type, and size.

² DLog Target Price is the difference between the Logs of the current target price and target price in the previous period.

³ Producer price index for machine-made pressed and blown lighting, automotive, and electronic glassware from BLS.

⁴ Producer price index of CRT glass from Bank of Korea.

⁵ Total LCD/(LCD+CRT) sales ratio by application. Extrapolated in years with missing data.

⁶ Quarterly growth rate of industrial production for G7 member countries.

⁷ Quarterly unemployment rate for G7 member countries.

⁸ Fixed effects by manufacturer-customer-product type-size (and finish) are included.

⁹ Clustered Robust Standard Errors by Manufacturer-Quarter.

Source: CRT Manufacturers' Sales Data; DisplaySearch; Bank of Korea; U.S. BLS; OECD; Conspiracy Documents.

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Figure 9: Target Price Influenced North American Prices

Variable	Estimate	Clustered ¹¹		
		St. Error	T-Value	P-Value
(1)	(2)	(3)	(4)	(5)
<i>Dependent Variable:</i>				
<u>Log(Actual Price)¹</u>				
Log Actual Price (-1)	0.191 *	0.102	1.878	0.063
Log Target Price (-1) * CDT * North America ²	0.609 ***	0.140	4.347	0.000
Log Target Price (-1) * CPT * North America	0.498 ***	0.112	4.430	0.000
Log Target Price (-1) * CDT * ROW ³	0.723 ***	0.102	7.074	0.000
Log Target Price (-1) * CPT * ROW	0.376 ***	0.108	3.487	0.001
DLog Target Price * CDT * North America ⁴	0.645 ***	0.126	5.117	0.000
DLog Target Price * CPT * North America	0.187 **	0.073	2.550	0.012
DLog Target Price * CDT * ROW	0.650 ***	0.079	8.184	0.000
DLog Target Price * CPT * ROW	0.123 **	0.061	2.016	0.046
Log BLS Glass Price (-1) * North America ⁵	0.430	0.267	1.608	0.111
DLog BLS Glass Price * North America	0.186	0.248	0.753	0.453
Log BOK Glass Price (-1) * ROW ⁶	0.226 **	0.099	2.278	0.025
DLog BOK Glass Price * ROW	0.227 *	0.119	1.912	0.058
Log CRT Quantity (-1)	0.002	0.003	0.857	0.393
LCD/(LCD+CRT) Sales (-1) ⁷	0.247	0.162	1.529	0.129
LCD/(LCD+CRT) Sales (-1) ²	-0.015	0.125	-0.119	0.905
G7 Production Growth ⁸	-0.001	0.005	-0.122	0.903
G7 Unemployment Rate ⁹	-0.013	0.017	-0.781	0.437
Trend	0.002	0.001	1.275	0.205
Trend-square	0.000 ***	0.000	-3.005	0.003
Constant	-0.469	1.324	-0.354	0.724
Fixed Effects ¹⁰	YES			
R-Square	0.962			
Observations	5,931			

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

¹ Quarterly average transaction price weighted by quantity for each manufacturer, customer, product type, and size.

² North American customers identified if bill-to-country (or ship-to-country if former missing) is U.S., Mexico, or Canada.

³ Rest of World customers identified if bill-to country (or ship-to if former missing) is not North-America or is Unknown.

⁴ DLog Target Price is the difference between the Logs of the current target price and target price in the previous period.

⁵ Producer price index for machine-made pressed and blown lighting, automotive, and electronic glassware from BLS.

⁶ Producer price index of CRT glass from Bank of Korea.

⁷ Total LCD/(LCD+CRT) sales ratio by application. Extrapolated in years with missing data.

⁸ Quarterly growth rate of industrial production for G7 member countries.

⁹ Quarterly unemployment rate for G7 member countries.

¹⁰ Fixed effects by manufacturer-customer-product type-size (and finish) are included.

¹¹ Clustered Robust Standard Errors by Manufacturer-Quarter.

Source: CRT Manufacturers' Sales Data; DisplaySearch; Bank of Korea; U.S. BLS; OECD; Conspiracy Documents.

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B. With Respect to Other CRTs

50. There were some CRT configurations for which I did not find price targets (representing about 1.8 percent of CDT shipments and 9.8 percent of CPT shipments). However, the evidence presented below shows price targeting likely would have impacted these CRTs as well. This evidence takes two forms. First, there is qualitative evidence drawn both from the discovery taken in this case and from economic theory that would lead one to expect that price targets would affect the pricing for all CRTs. Second, statistical analysis reveals a close and consistent relationship among actual prices for CRTs with price targets and prices for other CRTs.

1. Qualitative Evidence

51. Most CRTs were used in a few key applications with well understood characteristics that manufacturers readily could produce. CPTs and CDTs were manufactured using the same basic production processes. Indeed, CPTs and CDTs could be—and were—produced on the same production lines.¹¹³ Product differentiation was largely a matter of size/performance metrics that each manufacturer was capable of producing. Indeed, there were standardized product specifications that all manufacturers used.¹¹⁴
52. A CRT production facility often produced a mix of products configured for different applications. It was possible to produce two different sizes on the same line in

¹¹³ See EIN0017699- EIN0018075 at 17729 and 17747; CHU00125257-CHU00125292 at 125264; Deposition of Jaemin Lee Vol. 1 (Samsung), June 6, 2012 at 113:8-114:3 and 115:5-16; Deposition of Chih Chun-Liu Vol. 1 (Chunghwa), February 19, 2013 at 34:1-35:2, “Q. Okay. And number 1 where it’s “CPTT”, When you manufactured both CPTs and CDTs, how many different lines of each did you have? A. Oh, it’s hard to say. Depends market: we have to modify this to this, this to that. I cannot remember. Q. Okay. So, if you had -- so depending on the market, you would adjust your lines to CPTs and CDTs; is that correct? A. Correct.”

¹¹⁴ Deposition of Deposition of Chih Chun-Liu Vol. 2 (Chunghwa), February 20, 2013 at 298:23-300:21. See also, Video Electronics Standards Association, “VESA and Industry Standards and Guidelines for Computer Display Monitor Timing (DMT), Version 1.0, Revision 11,” May 1, 2007, ftp://ftp.cis.nctu.edu.tw/pub/csie/Software/X11/private/VeSaSpEcS/VESA_Document_Center_Monitor_Interface/DMTv1r11.pdf. The principal dimensions of product differentiation in CRTs were application, size, and resolution. Other ancillary features of the tubes included contrast ratio, brightness, flatness, and power consumption. The first three of these resemble resolution, in that more is generally better (for size there would have been some exceptions to this in certain uses). The last has the opposite hierarchy, where less is better.

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tandem (one unit of one size and then, the other unit of the next size).¹¹⁵ If a customer wanted to change certain aspects of the configuration, the production lines were flexible enough to make those changes in short order, in some cases within the same day.¹¹⁶ Given this flexibility, price differences between CRTs of different characteristics that were not cost-related would be expected as an economic matter to induce changes in output in favor of the more profitable configurations, creating market pressure to re-align prices. As a result, prices across CRT configurations would be economically linked over time.

53. This created a structured pricing environment in which buyers and sellers started with base configurations and then incorporated add-ons associated with a particular customer need. This structure is reflected in the documents and deposition testimony taken in this case.¹¹⁷ In numerous meeting documents, prices for CRTs were presented as differentials from other CRTs.¹¹⁸ In addition, price differentials sometimes were given for specific product characteristics, for example, “[t]he current Agreed Price should be 0.28MPRII/USD150, 0.26TCO/USD160, Dot Pitch price difference remained at USD5.”¹¹⁹ The conspirators paid attention to this structure in their efforts to inflate prices, for example, observing in one instance, “This would narrow the price difference between 15” and 17” and would in turn affect the success

¹¹⁵ Deposition of Jay Alan Heinecke (Toshiba), July 31, 2012 at 84:10-17; EIN0017699- EIN0018075 at 17729 and 17747. “The Company’s CRT production lines are highly flexible. Both CDT and large CPT lines,...can produce two different sizes at the same time.”

¹¹⁶ Deposition of Jay Alan Heinecke (Toshiba), July 31, 2012 at 82:13-85:22.

¹¹⁷ CHU00029144.01E- CHU00029146.02E at 29145.01E-29146.02E, List price conversion for if the model is ITC or Bare; CHU00029147E-CHU00029151E at 29149E -29150.01E; CHU00031111.01E- CHU00031112.02E at 31112.01E, “Each maker agreed to change the price differential between 17” regular and flat tubes to \$14;” CHU00030809.01E-CHU00030814E at 30810.01E, “the price differentials for Coating, Frequency, and Dot Pitch will be, respectively, USD 3/pc, USD2/pc, and USD 5/pc.”

¹¹⁸ See e.g., CHU00014200.01E- CHU00014201E at 200.02; CHU00028760E -CHU00028747E.

¹¹⁹ See CHU00030807.01E- CHU00030815.E at 808.01E.

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in price hike for the 15".¹²⁰ The following testimony was given in the Liu deposition:¹²¹

Q: Let's assume for a moment that you were to raise the price of 15-inch color picture tubes, without changing the price of the 17-inch color picture tubes. Do you have an understanding, based upon your years of experience in the CRT business, what effect, if any, that would have on the relative mix of sales of 15-inch and 17-inch CPT tubes?

THE WITNESS: This question is not difficult. We are professionals in this industry. We are selling tubes like professionals if not experts. How could we only change the price of a 15 inches tubes [sic] without changing the prices for 17 inches of tubes? Of course, we would consider the overall market structure and the market acceptance and the reasonable cost gaps. We would certainly raise the prices at the same time.

THE WITNESS: [...] [T]he price will be an overall comprehensive consideration of all products. We would not focus only on one type of products unless the cost gaps were unreasonably different. We would not only raise the price for 15 inches without changing prices of all other items unless there is a particular situation that the purchase of 17 inches was not that strong and the purchase for 15 inches was particularly strong. Otherwise we would have an overall comprehensive consideration of the products categorically.

54. From this perspective, the coordination and limits on competition that rest at the heart of this alleged conspiracy would be expected to have influenced prices across the product spectrum. Conspiratorial agreements regarding price targets for top-

¹²⁰ See CHU00030807.01E-CHU00030815E at 30807.02E.

¹²¹ See Deposition of Chih Chun-Liu Vol. 2 (Chunghwa), February 20, 2013 at 296:3-298:1.

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selling CRTs in their base configuration would both 1) readily signal a corresponding set of prices for other configurations of those same CRTs and 2) affect the prices of other CRTs.

2. *Statistical Evidence*

55. One can see the existence of this price structure through correlation coefficients over time between prices associated with pairings of top-selling CRTs. Figure 10 shows these correlation coefficients among the top selling sizes for CDTs and CPTs.¹²² The pair-wise correlation coefficients were generally above 0.9.
56. I examine price levels rather than price changes because as a statistical matter, changes in prices can be completely uncorrelated even where price levels track together very closely over time.¹²³ As discussed above, the relationship between target prices and actual prices involved much more than simple short-run dynamics. Price targets exerted some of their effect on current prices with a lag (i.e. not solely in a contemporaneous fashion) and the impact of target prices on current prices also operated through the effects of those targets on CRT prices in the prior quarter, which served, in turn to influence current quarter price levels.¹²⁴

¹²² I calculate the correlations using Fisher Matched-Model price indices. These indices are designed to measure price changes in a group of products accounting for changes in the composition of sales among the different products. In constructing this index, price changes for each CRT model were computed and averaged together based upon sales weights. See *Consumer Price Index Manual: Theory and Practice*, 2004, 4-9.

¹²³ As the Nobel committee once noted in connection with its award of the Nobel Prize in Economics, “Even if a statistical model based solely on difference terms can capture the short-run dynamics in a process, it has less to say about the long-run covariation of the variables. This is unfortunate because economic theory is often formulated in terms of levels and not differences.” Royal Swedish Academy of Sciences, “The Prize in Economics 2003 - Information for the Public.” http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2003/popular.html. Another recent article notes that “...by taking differences of the original level equation, one loses information that speaks to the relationship between the explanatory variables and GDP growth.” D. N. DeJong and M. Ripoll, “Tariffs and Growth: An Empirical Exploration of Contingent Relationships,” *The Review of Economics and Statistics* 88-4 (Nov. 2006): 625-640. Y.P. Mehra, “An Error-Correction Model of U.S. M2 Demand,” *Economic Review*, Federal Bank of Richmond (May/June 1991) explains that “... money demand functions estimated in first-difference form may be misspecified because such regressions ignore relationships that exist among the level variables.”

¹²⁴ Another problem with an analysis of price changes is that the underlying data contain quarter-to-quarter fluctuations that are solely related to measurement issues.

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Figure 10: Correlations Between Prices of Major CRT Sizes

	CDT			
	CDT 14	CDT 15	CDT 17	CDT 19
CDT 14	1			
CDT 15	0.988	1		
CDT 17	0.953	0.974	1	
CDT 19	0.937	0.872	0.986	1

	CPT							
	CPT 14	CPT 15	CPT 20	CPT 21	CPT 25	CPT 26	CPT 29	CPT 34
CPT 14	1							
CPT 15	0.996	1						
CPT 20	0.982	0.981	1					
CPT 21	0.949	0.957	0.965	1				
CPT 25	0.941	0.942	0.931	0.930	1			
CPT 26	0.938	0.949	0.976	0.957	0.885	1		
CPT 29	0.952	0.959	0.978	0.978	0.917	0.990	1	
CPT 34	0.964	0.973	0.987	0.977	0.928	0.991	0.992	1

Note: Quarterly Fisher Price Indexes by CRT type and size.

Sizes accounting for at least 3% of CDT or CPT shipments respectively.

CDT sizes collectively account for around 98% of CDT shipments.

CPT sizes collectively account for around 93% of CPT shipments.

Source: CRT Manufacturers' Sales Data

57. To see the manner in which prices for non-targeted CRTs moved with prices for targeted CRTs, I looked at correlation coefficients between prices for these two groups. Figure 11 lists CRTs (by size and type) with at least \$10 million in sales for which I found no targets. For each of those CRTs, I show the median correlation coefficient between its prices and prices paid for the targeted CRT of the same type. For 13 of the 18 CRTs shown in Figure 11, the correlation coefficients exceed 0.8. Weighted by sales dollars, the average correlation coefficient between prices for CRTs without targets and prices for a targeted CRT was 0.93.

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Figure 11: Correlations between Prices of Targeted and Other CRTs

Non-Targeted CRTs	Median Correlation With Targeted CRT Within Type	Sales (1995 - 2007) (Dollars)	
CDT 10	0.80	\$	104,602,768
CDT 12	-0.24		49,500,312
CDT 20	0.92		645,036,224
CDT 21	0.94		1,785,868,800
CPT 6	0.93		55,422,588
CPT 10	0.88		391,637,184
CPT 16	0.93		57,417,416
CPT 17	0.86		68,731,368
CPT 19	0.46		177,459,008
CPT 22	0.89		18,649,140
CPT 24	0.69		92,738,064
CPT 26	0.95		2,458,341,888
CPT 33	0.94		1,253,861,760
CPT 34	0.97		4,505,931,264
CPT 36	0.85		1,037,642,560
CPT 38	0.96		2,064,037,888
CPT 39	-0.37		44,923,320
CPT 40	0.61		70,894,096
Weighted Average	0.93		
Total Non-Targeted CRT Sales		\$	14,882,695,648
Total Targeted CDT Sales		\$	36,456,328,448
Total Targeted CPT Sales		\$	40,674,592,000

Note: Quarterly Fisher Price Indexes by CRT type and size.

Non-Targeted products with less than \$10 million sales omitted.

Correlation coefficients based on fewer than 7 quarters omitted.

Source: CRT Manufacturers' Sales Data;

Target Price Data from conspiracy notes.

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VII. Global Reach of the Alleged Conspiracy

58. The CRT industry was global.¹²⁵ In their internal reporting and analysis of market conditions, the conspirators typically referenced global demand conditions.¹²⁶ The antitrust authorities here in the U.S. and abroad have all recognized the activities at issue here as a global CRT conspiracy.¹²⁷ My review of conspiracy meeting documents shows the conspirators were cognizant of regional price levels and adjusted them to keep them in line with their global pricing strategy.¹²⁸
59. During the conspiracy period, the U.S. was one of the largest consumers of CRTs in the world.¹²⁹ Presumably then, a global price-fixing conspiracy would have impacted the U.S. and CRT prices in North America would track those elsewhere in the world. In fact, this is what I found. In Figure 12 and Figure 13, I compare prices paid during

¹²⁵ E.g., DisplaySearch 2007, DisplaySearch Q2' 07 Quarterly Global TV Shipment and Forecast Report, SEAI-CRT-00223186.

¹²⁶ See e.g., CHU00028685 - CHU00028686 at 686E (document recording a meeting between SDI and Chunghwa including a global CDT demand projection of 87.2 million in 1998); SDCRT-0087934 - SDCRT-0087937 at 7936E (meeting report between LPD and Toshiba forecasting global demand); and CHU00030559 - CHU00030562 at 0559.01E (meeting report with Chunghwa, Thai-CRT, Toshiba, SDI, and LPD reporting on global capacity and demand).

¹²⁷ The indictment charged “the former Chairman and Chief Executive Officer of Chunghwa Picture Tubes Ltd. for his participation in global conspiracies to fix prices of two types of cathode ray tubes (CRTs) used in computer monitors and televisions ... [and] conspiring with others to suppress and eliminate competition by fixing prices, reducing output and allocating market shares of color display tubes (CDTs) to be sold in the U.S. and elsewhere, beginning at least as early as Jan. 28, 1997, until at least as late as April 7, 2003.” *U.S. Department of Justice press release* “Former Executive Indicted for His Role in Two Cathode Ray Tube Price-Fixing Conspiracies, Global Price-fixing Scheme Involves Tubes Used in Computer Monitors and Televisions,” February 10, 2009 available at <http://www.justice.gov/opa/pr/2009/February/09-at-110.html>.

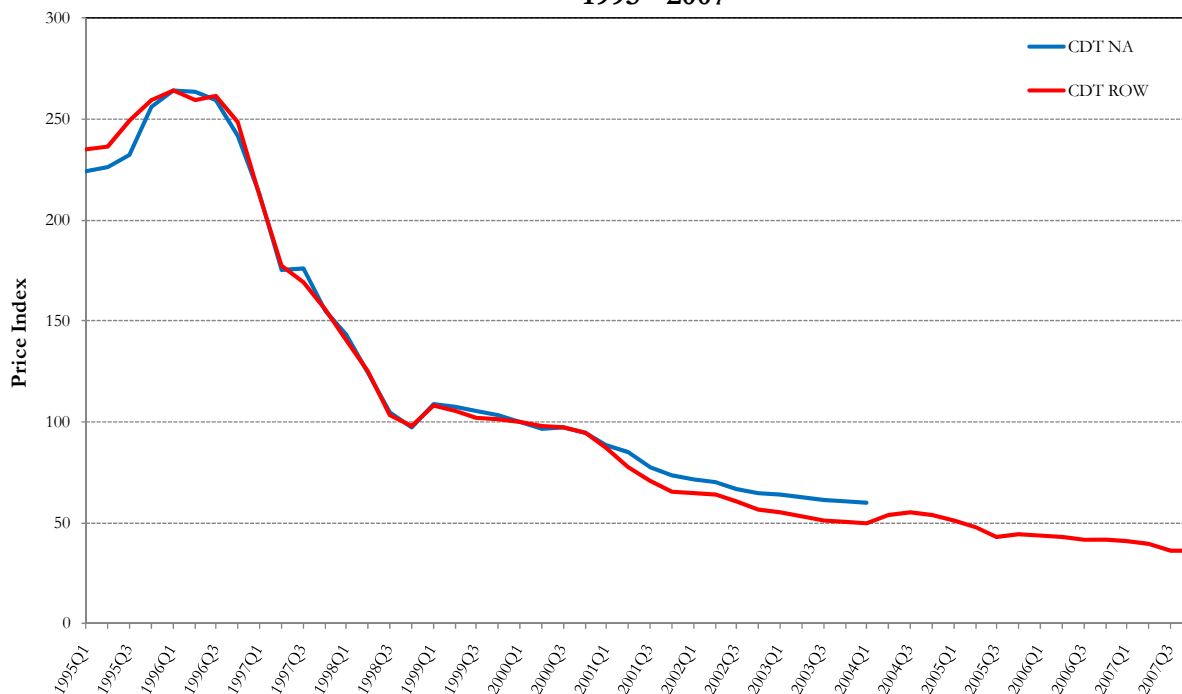
¹²⁸ For example, see CHU00029131E - CHU00029137E at 29131E: “The reasonable price in Europe will be a 116% level of S.E. Asia due to the additional cost, e.g. freight charge and import duties etc.” CHU00029138E - CHU00029140 at 29138.02E: “even though the price for 14” tube in Europe had dropped dramatically due to decreased demand, right now demand for 14” tubes in Europe is hot and originally the difference between the tube price in the European and Asian markets was more than \$5.0, but now that the price in Asia has risen to around ITC \$35, the price target in Europe should be increased to above \$40.”

¹²⁹ Defendants’ transactional CRT sales data show that approximately 18 percent of the tubes (with known bill-to-country information) were sold to the U.S. customers, which was the second largest after China. According to DisplaySearch, between 1999 and 2007, North America had the largest share for CRT monitors sold at around 30 percent.

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the conspiracy by North American purchasers with prices paid by purchasers in foreign locations.¹³⁰

Figure 12
Prices of CDTs Sold to North America vs. the Rest of the World
Quarterly Fisher Matched-Model Price Indexes
1995 - 2007

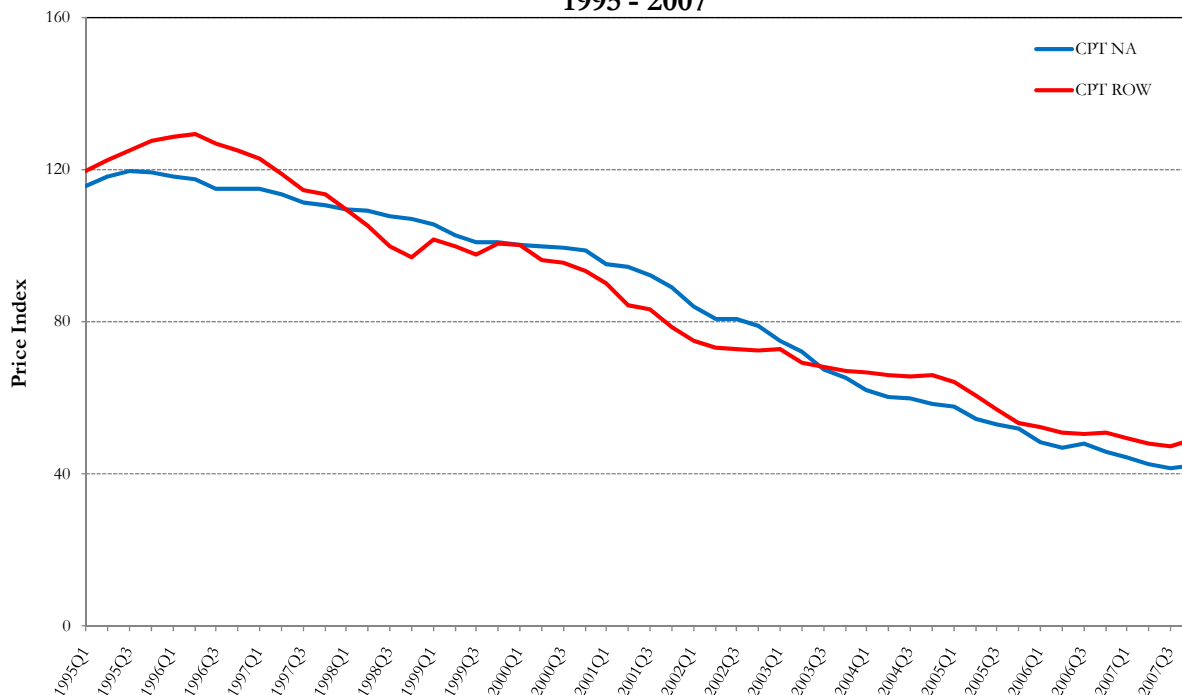


Source: CRT Manufacturers' Sales Data.

¹³⁰ I identified sales as North American if the bill-to-country (or the ship-to-country if that is not available) is U.S., Mexico, or Canada. I note that the Defendants' data on the country of sales are missing for approximately a third of the transactions.

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Figure 13
Prices of CPTs Sold to North America vs. the Rest of the World
Quarterly Fisher Matched-Model Price Indexes
1995 - 2007



Source: CRT Manufacturers' Sales Data.

VIII. Entry Barriers

60. Economists recognize entry barriers as a factor that promotes successful maintenance of a conspiracy and, in that fashion, continuing broad impact on direct purchasers. During the Class Period, the CRT industry was characterized by large initial investments that could not readily be salvaged by exiting the industry and substantial excess capacity. Typical costs to set up a new CRT plant were between \$100-300 million.¹³¹ For example, in 1996, Daewoo invested \$150 million to build a CRT factory located in the northeastern province of France¹³² and LG Electronics built a

¹³¹ See SDCRT-0068880-SDCRT-0069081 at 8922, CPT factories are estimated to “cost between \$70- and \$332 million and take up two years to build” and the Deposition of Tatsuo Tobinaga (Panasonic), July 16, 2012 at 146:8-10 and 151:15-152:11. The cost for a manufacturing facility for a standard large product line was approximately 10 billion yen, or 120-130 million US dollars.

¹³² Korea Economic Daily, “Daewoo Electronics to Build a \$150 Mil. CRT Plant in France,” February 8,

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plant in Korea, for the production of 24 – 32 inch CRTs, which cost \$125 million to build and was expected to produce 1 million CRTs per year.¹³³ A new CRT plant also involved a significant time commitment. Time from start of building to a functional plant could be up to two years.¹³⁴ Additional investment in a plant was often necessary and expanding plant capacity was expensive.¹³⁵ Once incurred, most of this investment was sunk, meaning that very little could be recovered if the manufacturer decided to exit the business. There was little use for the factories outside of CRT production¹³⁶ and sale of the machinery and other equipment was difficult.¹³⁷

61. This created pressure to maintain high levels of capacity utilization.

A new CPT plant was estimated by producers to cost \$70- to \$332 million and take up to two years to build. Merely to increase capacity by adding current lines was estimated to cost up to \$160 million and take up to two years to complete. Once established, furthermore, it is difficult to be profitable, at least initially, due to what the staff report cites as ‘the need to operate plants at relatively high levels of capacity utilization.’ And it’s not

1996.

¹³³ Telecompaper, “LG Electronics to Invest in CRT Plant,” September 6, 1995, <http://www.telecompaper.com/news/lg-electronics-to-invest-in-crt-plant>, accessed March 22, 2012.

¹³⁴ Deposition of Tatsuo Tobinaga (Panasonic), July 16, 2012 at 146:11-147:8; SDCRT-0068880-SDCRT-0069081 at 8922.

¹³⁵ PHLP-CRT-051982- PHLP-CRT-052085 at 52078; EIN0017699- EIN0018075 at 17842; PR Newswire, “Zenith Breaks Ground For Expansion of Melrose Park Color Picture Tube Plant,” March 13, 1996, <http://www.thefreelibrary.com/ZENITH+BREAKS+GROUND+FOR+EXPANSION+OF+MELROSE+PARK+COLOR+PICTURE+TUBE...-a018086464>; PR Newswire, “Matsushita and Toshiba to Launch North American Operations of New CRT Joint Venture - New Company to Become Leading Large- Screen CRT Manufacturer in N. America,” March 28, 2003, <http://www.thefreelibrary.com/Matsushita+and+Toshiba+to+Launch+North+American+Operations+of+New+CRT...-a0131732577>.

¹³⁶ See Deposition of Nobuhiko Kobayashi (Hitachi), July 17, 2012 at 93:7-25. “Q: Do you know whether CRT production facilities can be used for manufacturing anything other than CRTs? A: Based on my understanding, that’s not possible.”

¹³⁷ See Deposition of Tatsuo Tobinaga (Panasonic), July 16, 2012 at 149:6-8. “Q:[] did you ever sell any equipment to third parties? A: We tried that, but it wasn’t successful.”

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even ‘relatively’; it’s high levels of capital utilization to be profitable.¹³⁸

62. However, this was an especially daunting prospect inasmuch as the CRT industry exhibited substantial excess capacity for most of the class period. By Toshiba’s calculations, CDT capacity equaled output in 1995, and thereafter exceeded output by as much as 35 percent in 1999.¹³⁹ Excess capacity in industries with high fixed costs (such as this one) can lead to dramatic price reductions under competitive conditions. That prospect can be a deterrent to would-be entrants.¹⁴⁰
63. Together, these conditions created entry barriers. Entry barriers promote widespread impact because they discourage new competitors (that might otherwise be attracted by inflated prices) who could de-stabilize the conspiracy or create pockets of competitive pricing.¹⁴¹ As one analyst described the industry:

The global CRT market is led primarily by Asian players. High entry costs and relatively low margins have deterred new players from entering the industry.¹⁴²

IX. Class-Wide Overcharges

A. CRT Overcharge Estimation Method

64. One method of examining the effect of a price-fixing conspiracy, widely recognized in the economic literature,¹⁴³ is to compare pricing during the period in which the

¹³⁸ Pat Magrath of Georgetown Economic Services speaking before the United States International Trade Commission, February 17, 2000, United States International Trade Commission, In the Matter of: Color Picture Tubes from Canada, Japan, Korea, and Singapore, SDCRT-0068880 - SDCRT-0069081 at 8922.

¹³⁹ TAEC-CRT-00065484.

¹⁴⁰ See F. M. Scherer and D. Ross, *Industrial Market Structure and Economic Performance* (Boston: Houghton Mifflin Company, 1990): 288 - 289.

¹⁴¹ “The easier entry into an industry (the lower entry barriers) the more difficult to sustain collusive prices. [] Overall, therefore, one should expect that the lower entry barriers (as determined by fixed entry costs that new firms would have to sink into the industry) the more difficult it will be to sustain collusion.” Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge: Cambridge University Press, 2004).

¹⁴² PHLP-CRT-051982 - PHLP-CRT-052085 at 2067.

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conspiracy operated to pricing beforehand and (or) afterwards.¹⁴⁴ This is commonly referred to as a “before/after” analysis. There are various methods of comparison that can be employed in before/after analysis. In some cases, a simple comparison of price levels between periods in which the conspiracy operated with levels in which it did not operate may suffice. In other cases, other market factors in addition to the conspiracy may impact prices during the period in question. When that is likely, more sophisticated methods are used to isolate the effects of the conspiracy.

65. One such method is to employ regression analysis to simultaneously estimate the market relationships between prices, market demand and supply variables and the presence of the conspiracy. In essence, this kind of regression analysis provides an estimate of the impact of the alleged conspiracy on prices, holding constant the effects of other supply/demand factors. Regression analysis of this sort (often referred to as “reduced form” models or modeling) is widely employed by economists.¹⁴⁵
66. I understand there is evidence to suggest that the effectiveness of the alleged conspiracy decreased after Q1 2006. The last management level CDT meeting apparently occurred in March of 2006.¹⁴⁶ The last documented price target applied to Q4 2006.¹⁴⁷ The last of the documented meetings relating to production and capacity

¹⁴³ For a review of well-established methods of economic analysis used to estimate damages in price-fixing litigation see: J. M. Connor, “Forensic economics: an introduction with special emphasis on price fixing,” *Journal of Competition Law and Economics* 4.1 (2008): 31-59 and P. Davis and E. Garcés, *Quantitative techniques for competition and antitrust analysis* (Princeton: University Press, 2009): 347-381. See also D. L. Rubinfeld, “Antitrust Damages,” *Research Handbook on the Economics of Antitrust Law*, Einer Elhauge editor, November 21, 2009.

¹⁴⁴ In some cases, data may not be available for periods of time either before or after the alleged conspiracy that are completely free from its effects. However, the available data may allow one to compare periods in which the alleged conspiracy was fully effective with periods in which it was only partially so, in which case one can estimate a lower bound on the overcharges created by the alleged conspiracy.

¹⁴⁵ See e.g., J. F. Nieberding, “Estimating Overcharges In Antitrust Cases Using A Reduced-Form Approach: Methods and Issues,” *Journal of Applied Economics*, IX- 2 (Nov 2006): 361-380; H. H. Chouinard, and J. M. Perloff, “Gasoline Price Differences: Taxes, Pollution Regulation, Mergers, Market Power, and Market Conditions,” *The B.E. Journal of Economic Analysis & Policy*, 7-1 (Jan 2007): 1-26.

¹⁴⁶ Korean Fair Trade Commission Multi-Party Meeting Decision Report, No. 2011-019 (March 10, 2011): 24, 150 and 165.

¹⁴⁷ See CHU00030449E-CHU00030457E at 451.01E (Although this document indicates there was a target

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was also in 2006.¹⁴⁸ The CPT Glass Meetings did not occur during the period between March of 2006 and September 5, 2006.¹⁴⁹ A CPT Glass Meeting did occur in Thailand as late as February of 2007.¹⁵⁰ One was scheduled to occur in early April of 2007, but there is no evidence that it took place.

67. Based on these facts, I have been instructed to assume that the alleged conspiracy ceased effective operations as of Q1 2007. As a matter of economics, it would not be surprising to find that the aftermath of the alleged conspiracy had some continuing, albeit reduced, effect on prices through the end of the year while the competitive process was being fully restored. However, by using a “dynamic” regression model that allows for persistence in the effects of the conspiracy, Q2 through Q4 of 2007 still can be used as a post-conspiracy period.
68. The transaction data produced by the Defendants and co-conspirators spans the time period from 1992Q1 to 2011Q1. The prices that I used in this analysis are quarterly average prices created from that transactional data. These data reflect global CRT sales by ten of the Defendants and co-conspirators: Chunghwa, Hitachi, LG Electronics, LG Philips Display, Mitsubishi, Panasonic, Philips, Samsung, Thomson, and Toshiba. Each observation in the quarterly dataset is the quantity-weighted average price for a manufacturer’s CRT model.¹⁵¹ I have treated the periods before Q2 1995 and after Q1 2007 as non-conspiracy periods. I have treated Q2 1995 through Q2 2006 as a period during which the alleged conspiracy was in full force and effect. I have treated Q3 2006-Q1 2007 as a second conspiracy period. I have interacted both of these conspiracy indicators with indicators for CDT and CPT to estimate separate conspiracy effects for the two CRT types.

price, the price itself was ambiguous in the document; thus I excluded it from the target price analyses above.)

¹⁴⁸ I was able to locate two such documents for 2006 meetings – one that occurred in March 2006 (CHU00102752E) and another that occurred in November 2006 (MTPD-0580821).

¹⁴⁹ Testimony of S.J. Yang before the Japan Fair Trade Commission, April 8-9, 2008, 17; MTPD-0479714E.

¹⁵⁰ CHU00442517- CHU00442518; CHU00100529- CHU00100530.

¹⁵¹ This quarterly average price is found by dividing total revenue by total quantity of shipments for a particular model-manufacturer combination. Transaction data are aggregated to a quarterly level because the data for several of the variables included in the regression analysis are only available on a quarterly basis.

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69. There is reason here to believe that there was persistence in CRT prices, which is to say a current quarter's prices reflected not just that quarter's economic conditions, but also CRT prices from the prior quarter. To allow for this possibility, I included the previous quarter's prices as an explanatory variable for prices in the current quarter.¹⁵² I also included lagged CRT sales and lagged growth in CRT sales to reflect other supply-side effects, such as economies of scale in production or demand side effects, such as diminishing popularity. I included growth in industrial production and unemployment rate for the G7 countries to capture the effect of general economic activity levels and business cycles on demand for CRTs.¹⁵³ I also included a variable to account for the effects of competition from LCD technology.¹⁵⁴ Since Defendants and co-conspirators did not provide usable cost data, I included proxy variables to account for changes in production costs. Glass is a primary raw material in the production of CRTs.¹⁵⁵ Hence, I include a BLS price index for machine blown and pressed glass¹⁵⁶ as well as a CRT glass index from Bank of Korea¹⁵⁷ along with the growth in these indices relative to the previous quarter.

¹⁵² The inclusion of lagged prices implies that in calculating overcharges from the estimated coefficients, I have to account for the effect of the alleged conspiracy on the lagged prices in addition to its immediate effect. See e.g., Nieberding, J. F., "Estimating Overcharges In Antitrust Cases Using A Reduced-Form Approach: Methods and Issues," *Journal of Applied Economics* IX-2 (Nov 2006): 361-380

¹⁵³ I estimate the regression model with the variables identified above (other than the conspiracy indicator and LCD share) expressed in logarithmic form because of the economic plausibility associated with the reduced form relationships specified in this fashion. In this form, the estimated coefficients can be understood to reflect the percentage change in the dependant variable that is brought about by a one percent change in the associated explanatory variable.

¹⁵⁴ I used a measure of LCD sales share relative to the LCD and CRT display market by application, extrapolated in the period when the data are missing (pre-1999 for Monitors and pre-2004 for TVs). I estimate a separate coefficient of this variable for CDTs and CPTs.

¹⁵⁵ "The major upstream industry for color television picture tubes is glass for CRTs. With a trend toward larger picture tubes, glass represents a growing percentage of the value of materials, currently around 60 percent, up from 30 percent just a few years ago." John Kitzmiller, *Industry and Trade Summary Television Picture Tubes and Other Cathode-Ray Tubes*, (USITC Publication 2877, 1995): 4.

¹⁵⁶ The U.S. Department of Labor, Bureau of Labor Statistics' Producer Price Index for "Machine-made pressed and blown lighting, automotive, and electronic glassware."

¹⁵⁷ The Bank of Korea, Economic Statistics System, CPT Producer Price Index, http://ecos.bok.or.kr/EIndex_en.jsp.

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70. Figure 14 shows the regression results. As expected, the coefficient on the cost variable is positive indicating that prices rise with costs. The coefficient for LCD shipments is negative, indicating as expected that the growing popularity of LCDs exerted downward pressure on CRT prices. The estimated coefficients for the conspiracy indicators are positive (and highly significant as a statistical matter), indicating that the conspiracy elevated CRT prices.¹⁵⁸ The demand and supply factors included in this model explain almost all of the variability in CRT prices (the estimated equation has an R-Squared of 0.98).

¹⁵⁸ Because of the prospect that there are common elements in CRT pricing across models for a given manufacturer in a given quarter, with variability across models largely the result of the differences in configurations (as per the hedonic analysis described above), I have utilized a method for calculating standard errors that essentially treats the experience across all models sold by a given manufacturer within a given quarter as a single observation. This method, which produces what are known as “cluster-robust standard errors” (see A. Colin Cameron and Pravin K. Trivedi, *Microeconometrics Using Stata* (Texas: Stata Press, 2010): 84-85), does not change the regression coefficient estimates but does result in more conservative measures of statistical strength (i.e., larger standard errors and lower t-statistics).

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Figure 14: CRT Overcharge Regression

Variable	Coefficient	Clustered Std.-Error ⁹	T-value	P-value
(1)	(2)	(3)	(4)	(5)
<i>Dependant Variable</i>				
<u>Log(CRT Price)¹</u>				
Conspiracy Indicator 1 * CDT ^{2a}	0.0728 ***	0.025	2.962	0.003
Conspiracy Indicator 1 * CPT	0.0410 **	0.018	2.321	0.021
Conspiracy Indicator 2 * CDT ^{2b}	0.0264 *	0.016	1.689	0.092
Conspiracy Indicator 2 * CPT	0.0583 ***	0.012	4.707	0.000
Log CRT Price (-1)	0.2838 ***	0.058	4.889	0.000
Log CRT Quantity (-1)	-0.0060 ***	0.001	-4.368	0.000
Dlog CRT Quantity (-1)	0.0062 ***	0.001	6.677	0.000
Log BLS Glass Price (-1) ³	0.2238 **	0.105	2.140	0.033
Dlog BLS Glass Price	0.0609	0.134	0.455	0.649
Log BOK Glass Price (-1) ⁴	0.2630 ***	0.056	4.667	0.000
Dlog BOK Glass Price	0.3278 ***	0.083	3.961	0.000
LCD/(LCD+CRT) Sales (-1) * CDT ⁵	-0.3691 ***	0.141	-2.622	0.009
LCD/(LCD+CRT) Sales (-1) * CPT	-0.7427 ***	0.121	-6.158	0.000
LCD/(LCD+CRT) Sales (-1)^2 * CDT	-0.1443	0.140	-1.029	0.304
LCD/(LCD+CRT) Sales (-1)^2 * CPT	0.2103 ***	0.081	2.597	0.010
G7 Industrial Growth ⁶	0.0033	0.003	1.122	0.262
G7 Unemployment Rate ⁷	-0.0537 ***	0.010	-5.203	0.000
Trend	-0.0035 ***	0.001	-3.447	0.001
Trend-squared	0.0003 ***	0.000	5.278	0.000
Constant	3.0155 ***	0.580	5.202	0.000
Fixed Effects ⁸	YES			
Observations	27,666			
R-squared	0.976			

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

¹ Quarterly average transaction price weighted by quantity for each application-size-manufacturer-model code

^{2a} Conspiracy Indicator takes the value one from 1995Q2-2006Q2

^{2b} Conspiracy Indicator takes the value one from 2006Q3-2007Q1

³ Producer price index for machine-made pressed and blown lighting, automotive, and electronic glassware from BLS.

⁴ Producer price index of CRT glass from Bank of Korea

⁵ Total LCD/(LCD + CRT) sales ratio by application. Extrapolated in years with missing data.

⁶ Quarterly Growth Rate of Industrial Production for G7 member countries

⁷ Quarterly Unemployment Rate for G7 member countries

⁸ Fixed effects by application-size-manufacturer-model code are included.

⁹ Cluster Robust Standard Errors by Manufacturer-Quarter.

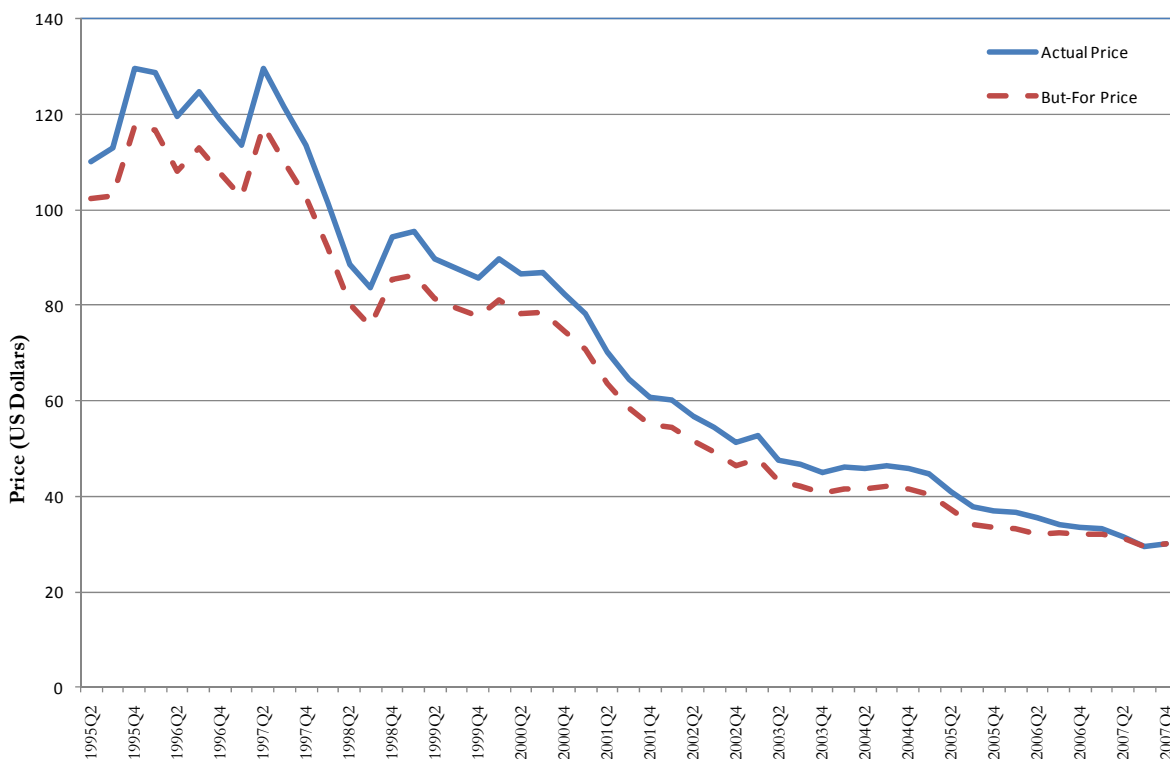
Source: CRT Manufacturers' Sales Data; DisplaySearch Data; Bureau of Labor Statistics; OECD StatExtracts Database

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71. The regression model of overcharges can be used to estimate CRT prices that would have prevailed absent the conspiracy. Figure 15 and Figure 16 below show comparisons of average actual prices for CDTs and CPTs with the estimated but-for prices.

Figure 15: Actual and But-For CDT Prices

Quarterly Weighted Average Actual and But-For Prices
CDT 1995Q2-2007Q4

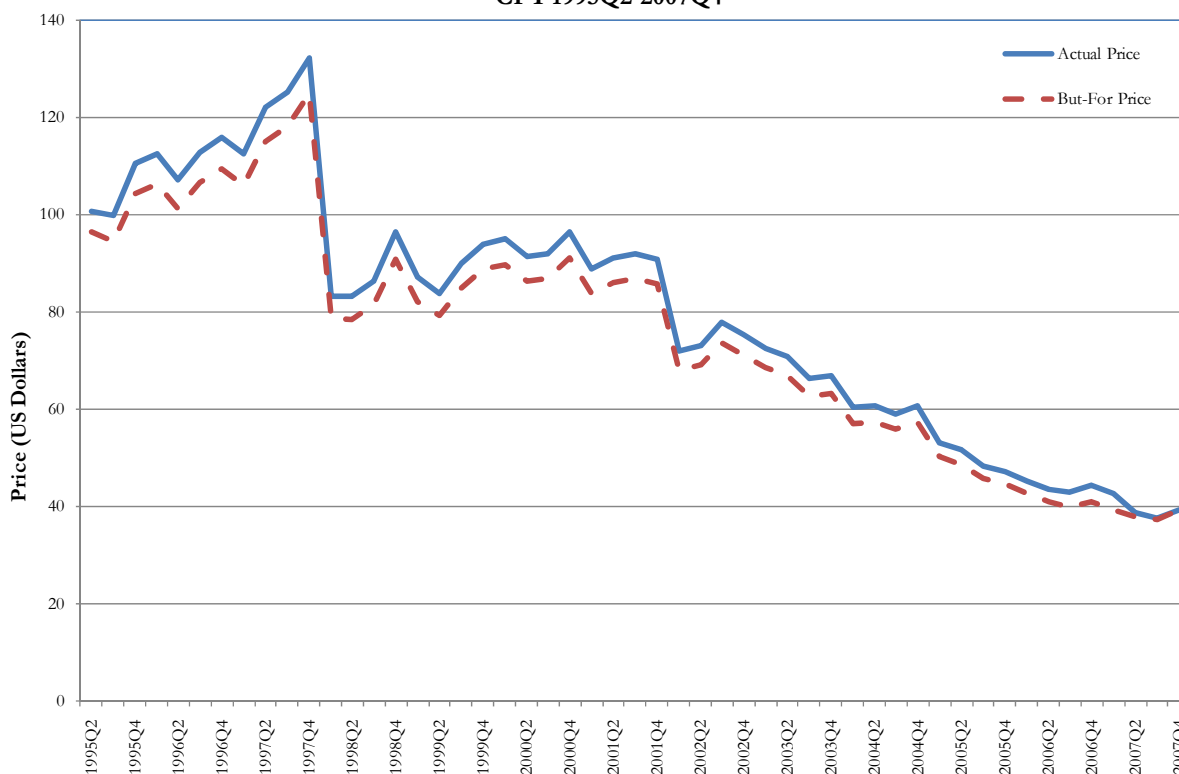


Source: CRT Manufacturers' Sales Data; Overcharge Regressions.

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Figure 16: Actual and But-For CPT Prices

Quarterly Weighted Average Actual and But-For Prices
CPT 1995Q2-2007Q4



Source: CRT Manufacturers' Sales Data; Overcharge Regressions.

72. The conspiracy effect estimated with this model grows during the initial quarters following the instigation of the alleged conspiracy and then declines towards the end of the alleged conspiracy period used in this estimate. Those percentages range from 0.1 percent to 10.5 percent for CDTs and from 0.2 percent to 8.3 percent for CPTs. The overcharges estimated by this model continue beyond the end of the period during which the alleged conspiracy was active to the end of 2007.

X. Overcharges for CRT Finished Products Purchased From Defendants and Co-Conspirators

73. I understand that the court has ruled that purchasers of CRT finished products from Defendants and co-conspirators may seek to recover CRT overcharges embedded in the costs of those finished products. In this section, I discuss economic and statistical evidence linking CRT finished product prices with CRT overcharges.

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A. Documentary Evidence Regarding CRT/CRT Product Price Relationships

74. Generally speaking, economics would lead one to expect that higher CRT prices would be reflected in higher prices for products that incorporate CRTs. First, of course, basic market economics involve a direct relationship between market prices and market supply costs. More than that, CRT producers who were conspiring to raise prices for their CRTs as a means for increasing the profits from that business would undermine that purpose by selling finished products including CRTs that did not embody the overcharge.
75. Conspirator documents reflect an understanding of this issue. For instance, a Chunghwa document discussing recently agreed upon price hikes for CRTs states that, “[W]e should also inform the customers of a possible second stage of price hike, so that they can take time to pass on to OEM customers.”¹⁵⁹ Meeting notes regarding a meeting between Chunghwa, Samsung, LG Electronics, and Orion state under “CDT price increase topic” that, “CPT indicated that the \$2 price increase this time was to facilitate monitor makers’ transfer of the CDT increase to customers.”¹⁶⁰
76. In addition, the trade press regularly discussed tube prices and their impact on finished products. A DisplaySearch report summarizes it as follows:

To calculate the CRT TV price, we used the previous quarter’s tube prices to determine the current quarter’s CRT TV street prices due to the lag between tube shipment and TV shipment. Thus, tube price reductions are reflected in street prices one quarter later.¹⁶¹

77. Notes from a meeting between Samsung, LG Electronics, Orion, Philips, and Chunghwa state that:

¹⁵⁹ Chunghwa Picture Tubes, Ltd., March 25, 2004, Return-from-Abroad Trip Report, CHU00031240.01E - CHU00031247E at 1242E.

¹⁶⁰ CHU00031183.01E - CHU00031185E at 1184.02E.

¹⁶¹ DisplaySearch, March 12, 2006, Quarterly TV Cost & Price Forecast Model & Report, SDCRT-0002283 - SDCRT-0002362 at 2290.

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Conclusion: Mr. David indicated that recently the newspapers and media have repeatedly published information about the expected rise of CDT and Monitor prices. It is quite helpful for our CDT and Monitor makers to raise the prices even further in the future.¹⁶²

78. A report of a June 23, 1999 meeting attended by Samsung, Orion, LG Electronics and Philips states, “CPT - President Lin indicated that raising the price on 15” not only benefits 15” CDT makers, but also gives Monitor makers the opportunity to adjust the price to create some profit margin for their no-profit-base business...”¹⁶³

B. Statistical Analysis of CRT Prices and Finished Product Prices

79. The CRT is the most costly input used in making CRT monitors and TVs, accounting for 45 to 50 percent of the cost of manufacturing the finished product and up to 70% of the cost of materials.¹⁶⁴ I have conducted a regression analysis to examine the statistical relationship between CRT prices and CRT product prices. Here again, I employed a reduced form model of product price formation. The pricing data used in this analysis is similar in form to that employed in the overcharge regression described above. The dependent variable in the regression is the quarterly volume-weighted average of the finished product prices for a particular type and size.
80. As explanatory variables, I have included measures of CRT prices, one for CDTs and one for CPTs. For those variables, I used the average price for CRTs sold during the previous quarter that were of the size¹⁶⁵ and type used for the finished products in

¹⁶² CHU00030701.01E-CHU00030704.02E at 702.01E.

¹⁶³ CHU00030787.01E-CHU00030794E at 791.01E.

¹⁶⁴ Hitachi testified that CRTs account for approximately 45% to 50% of the manufacturing cost of finished monitors or TVs; see Deposition of Yasu Hisa Takeda Vol. 1 (Hitachi), July 12, 2012 at 11:21-12:24. LGE testified that CRTs accounted for between 60%-70% of the total component cost of CRT TVs; see Deposition of Yun Seok Lee (LG Electronics), July 11, 2012 at 72:14-18.

¹⁶⁵ TV screen sizes appear to be one inch smaller than the tubes used in them for smaller TV sizes and up to two inches smaller for larger TV sizes. Accordingly, I adjusted TV sizes to match with tubes one size up for TVs less than 27 inch and two sizes up for those larger than 27 inches.

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question. As additional explanatory variables, I included share of LCD in the display market for each type, G7 industrial production growth and the unemployment rate. For CDT products, I included growth in desktop PC shipments. For CPT products, I included a producer price index for TV tuners.

81. Figure 17 presents the results of this analysis. The relationship between CRT prices and CRT product prices is reflected in the coefficient associated with the CRT price variables. The coefficients indicate that increases in CRT prices resulted in increases in finished product prices both for CDTs and CPTs. For CPTs, a one percent price increase was associated, on average, with a 0.78 percent increase in the finished product price. For CDTs, a one percent increase in price was associated, on average, with a 0.72 percent increase in the finished product price. For example, if a \$100 CPT increased in price to \$101 (i.e. 1 percent), a \$200 TV containing that tube would be expected to increase in price by \$1.56 (i.e. 0.78 percent of the \$200 finished product price). If a \$100 CDT increased in price to \$101, a \$150 monitor containing that tube would be expected to increase in price by \$1.08 cents (i.e. 0.72 percent of the \$150).¹⁶⁶

¹⁶⁶ This analysis utilizes costs differences across time and across product types to identify the relationship between CRT costs and CRT finished product prices. By incorporating fixed effects in the regression model the relationship can be estimated using solely intertemporal changes in price. Although there may be other cost factors that vary with size besides the CRT price, such an approach is inferior because it greatly reduces the data with which to identify the pass-through relationship. However, as a check I estimated a version of this model that included fixed effects by application and size. Those results confirm that there is a positive and statistically significant pass-through relationship for both TV and monitor tubes.

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Figure 17: CRT Finished Product Regression

Variable	Coefficient	Clustered Std. Error ⁸	T-value	P-value
	(1)	(2)	(3)	(4)
<i>Dependant Variable</i>				
<u>Log(CRT Finished Product Price) ¹</u>				
Log CDT Tube Price (-1) * Monitor Indicator ²	0.721 ***	0.034	21.136	0.000
Log CPT Tube Price (-1) * TV Indicator ²	0.776 ***	0.017	46.748	0.000
LCD/(LCD+CRT) Sales (-1) * Monitor Indicator ³	-0.699 *	0.417	-1.676	0.094
LCD/(LCD+CRT) Sales (-1) * TV Indicator	3.515 ***	0.852	4.124	0.000
LCD/(LCD+CRT) Sales (-1) ^ 2 * Monitor Indicator	2.423 ***	0.651	3.723	0.000
LCD/(LCD+CRT) Sales (-1) ^ 2 * TV Indicator	-1.752 ***	0.653	-2.684	0.007
DLog Desktop Shipments x Monitor Indicator ⁴	0.038	0.220	0.170	0.865
Log TV Tuner PPI x TV Indicator ⁵	-0.011	0.034	-0.307	0.759
G7 Industrial Growth ⁶	-0.007	0.016	-0.454	0.650
G7 Unemployment Rate ⁷	0.143 ***	0.054	2.641	0.008
Trend	-0.018 ***	0.005	-3.871	0.000
Trend ^ 2	-0.002 ***	0.000	-4.715	0.000
Constant	1.193 ***	0.293	4.074	0.000
Observations	876			
R-squared	0.774			

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

¹ Quarterly average transaction price weighted by quantity for each application and size.

² Quarterly average transaction price of ITC tubes weighted by quantity for each application and size; matched with finished product prices based on application and same size for monitors; one size up for TVs less than 27 inch and two sizes up for larger TVs.

³ Total LCD/(LCD + CRT) sales ratio by application. Extrapolated in years with missing data.

⁴ Growth in Desktop PC World Wide Shipments interacted with an indicator for CDT.

⁵ Quarterly Production Price Index for TV Tuners interacted with an indicator for CPT.

⁶ Quarterly Growth Rate of Industrial Production for G7 member countries.

⁷ Quarterly Unemployment Rate for G7 member countries.

⁸ Standard Errors adjusted for dusterling at the application-size and quarter level.

Source: CRT Manufacturers' Sales Data; DisplaySearch; Bank of Korea; U.S. BLS; OECD

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C. Class Overcharges

1. *Class CRT Sales and Damages*

82. Using the overcharge estimates provided above, the calculation of class-wide overcharges is a straightforward matter. The CRT sales data produced in this case, though incomplete in important respects,¹⁶⁷ allows me to calculate sales by Defendants and co-conspirators to Class Members each year. Starting with that information, I could then apply the overcharge percentages for each type of CRT in each year (derived from the overcharge model described above) to obtain the total overcharge amount associated with each type of CRT each year.

2. *Class CRT Finished Product Sales and Damages*

83. Similarly, I can use the Defendants' and co-conspirators' finished product transactions data to calculate Class finished product sales and damages for the sales recorded in the data.¹⁶⁸ I understand that the measure of damages on CRT finished product purchasers is the amount of the overcharge on the CRTs they contain. Accordingly, to calculate damages associated with CRT finished product purchasers, I would first compute the average annual dollar overcharge associated with the corresponding (by CRT type) CRT, by applying the overcharge percentage derived above to the CRT price. I would then take this average per-unit dollar amount of overcharge on the CRT and multiply it by the corresponding units of CRT finished product sales to the Class Members.¹⁶⁹ Adding those totals across products over time, I would obtain total overcharges for CRT finished products sold by the Defendants and co-conspirators.

¹⁶⁷ Some Defendants did not produce complete sales data. For example, Samsung did not produce any CRT sales data for years 1995 through 1997 and Hitachi apparently did not produce CRT sales data for its facilities in Singapore and Malaysia, as well as SEG Hitachi's facility in China. In addition, many of the transaction entries in Defendants' data do not specify the sales destination (in particular, whether it was shipped or billed to the U.S.) and therefore a sale to a Class Member.

¹⁶⁸ I understand that the CRT finished product data produced by Defendants and co-conspirators were limited to U.S. sales data.

¹⁶⁹ Formulaically: *CRT Finished Product Overcharge* = (*CRT Overcharge Percentage* * *CRT Price* * *CRT Finished Products Quantity Sold*.)

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I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. This declaration was executed on the thirty-first day of October at Los Angeles, California.



Jeffrey J. Leitzinger
November 6, 2014

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APPENDIX A. CRT Manufacturers

84. **Chunghwa Entities:** Chunghwa Picture Tubes, Ltd., or “Chunghwa PT,” was established in 1971¹⁷⁰ by the Tatung Corporation and at one point was the largest domestic Taiwanese CRT manufacturing company.¹⁷¹ Chunghwa Picture Tubes (Malaysia), or “Chunghwa Malaysia,” is a Malaysian subsidiary of Chunghwa PT.¹⁷²
85. **Orion Entities:** Orion Electric Company, owned by the Daewoo group, was one of Korea’s largest CRT manufactures until Daewoo filed for bankruptcy in 2004.¹⁷³ In 1995 approximately 85% of its one billion sales was in color picture tubes and color display tubes.¹⁷⁴ Orion Electric was involved in many joint-ventures including a joint-venture with Daewoo Electronics in French CRT manufacturer Daewoo-Orion Société Anonyme, or “DOSA.”¹⁷⁵ Daewoo International Corporation, or “Daewoo International,” is a Korean corporation¹⁷⁶ that manufactured CRT Products. Daewoo Electronics Corporation, formerly Daewoo Electronics Company, or “Daewoo Electronics” is a South Korean subsidiary of Daewoo International¹⁷⁷ and part of the Daewoo Group.¹⁷⁸ Daewoo Electronics, along with its subsidiaries and affiliates,

¹⁷⁰ See Chunghwa Picture Tubes, Ltd., “Company Profile,” 2006, http://www.cptt.com.tw/cptt/english/index.php?option=com_content&task=view&id=13&Itemid=32.

¹⁷¹ M. Pecht and C.S. Lee, “Flat Panel Displays: What’s Going on in East Asia Outside Japan,” 2 and 16, <http://www.calce.umd.edu/general/AsianElectronics/Articles/DISPLAY.htm>.

¹⁷² Chunghwa Picture Tubes, Ltd. and Subsidiaries, “Consolidated Financial Statements for the Six-Month Periods Ended June 30, 2005 and 2006 with Review Report of Independent Auditors (Unaudited),” August 21, 2006, 9, http://www.cptt.com.tw/cptt/chinese/backend/files/CPTQRen_06Q2con.pdf.

¹⁷³ Bailey Somers, “Daewoo Granted Chapter 15 Protection,” Law360, October 23, 2006, <http://www.law360.com/articles/12214/daewoo-granted-chapter-15-protection>.

¹⁷⁴ M. Pecht and C. S. Lee, “Flat Panel Displays: What’s Going on in East Asia Outside Japan,” 7, <http://www.calce.umd.edu/general/AsianElectronics/Articles/DISPLAY.htm>.

¹⁷⁵ Ibid.

¹⁷⁶ Daewoo, “Overview,” <http://www.daewoo.com/english/company/overview.jsp>.

¹⁷⁷ Daewoo International Corporation, “Electronic Industry Division,” http://www.daewoo.com/english/business/electronics.jsp?nav=2_2_4 and Daewoo International Corporation, “Electronic Industry Division Team and Item,” http://www.daewoo.com/english/online/brand/item.jsp?d_id=11.

¹⁷⁸ Also includes Daewoo Electronics, Daewoo Telecom Company, Daewoo Corporation and Orion Electric Components Company.

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manufactured and sold both CRTs and CRT Products.¹⁷⁹ In December 1995, Daewoo, along with Toshiba Corporation and other entities, formed P.T. Tosummit Electronic Devices Indonesia, or “TEDI,” an Indonesian CRT manufacturer.¹⁸⁰

86. **Hitachi Entities:** Hitachi, Ltd. is the Japanese parent company for Hitachi brand CRT Products.¹⁸¹ Hitachi Displays was a Japanese subsidiary of Hitachi, Ltd. and formerly part of “Mobara Works of Hitachi, Ltd.,” that manufactured CRT Products.¹⁸² Hitachi America, Ltd. is an American subsidiary of Hitachi, Ltd. that sold and distributed CRT Products.¹⁸³ Hitachi Electronic Devices (USA), or “HEDUS,” is an American subsidiary of Hitachi, Ltd. that manufactured CRT Products.¹⁸⁴ Hitachi Asia, Ltd., or “Hitachi Asia” is a Singaporean subsidiary of Hitachi that manufactured CRT Products.¹⁸⁵ Shenzhen SEG Hitachi Color Display Devices, Ltd., or “Hitachi Shenzhen,” is a Chinese subsidiary of Hitachi, Ltd. that manufactured, sold and distributed CRT Products.¹⁸⁶

87. **Irico Entities:** Irico Group Corporation or “IGC” is the Chinese parent company for several subsidiaries that manufactured CRTs and CRT Products, including Irico

¹⁷⁹ M. Pecht and C. S. Lee, “Flat Panel Displays: What’s Going on in East Asia Outside Japan,” 7, <http://www.calce.umd.edu/general/AsianElectronics/Articles/DISPLAY.htm>.

¹⁸⁰ Toshiba, “Toshiba’s Joint Venture in Indonesia Starts Manufacturing Color Picture Tubes for TVs,” June 24, 1996, http://www.toshiba.co.jp/about/press/1996_06/pr2401.htm; Toshiba, “Toshiba Establishes Joint Venture in Indonesia to Manufacture and Market TV Color Picture Tubes,” March 10, 1995, http://www.toshiba.co.jp/about/press/1995_03/pr1001.htm.

¹⁸¹ Hitachi Displays, “History: from 1991 to Today,” http://www.hitachi-displays.com/en/company/history/2012176_18547.html.

¹⁸² Ibid.

¹⁸³ Hitachi in U.S.A., “Legacy Products,” <http://www.hitachi.us/products/legacy/>.

¹⁸⁴ Hitachi America, Ltd., “Products and Services: Consumer Electronics,” <http://www.hitachi-america.us/>.

¹⁸⁵ Hitachi, “Hitachi in Singapore,” <http://www.hitachi.com.sg/about/hitachi/index.html>. Hitachi, “Hitachi to Withdraw from CRTs for PC Monitors,” July 26, 2001, <http://www.hitachi.com/New/cnews/E/2001/0726b/>.

¹⁸⁶ Chinabidding.com, “Hitachi Subsidiary Sets Up Shenzhen Office,” March 02, 2006, <http://www.chinabidding.com/news.jhtml?method=detail&channelId=277&docId=528867>; Businessweek, “Company Overview of Shenzhen SEG Hitachi Color Display Devices Co., Ltd.,” <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=38948436>.

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Group Electronics Col, Ltd., or “IGE,” and Irico Display Devices Co., Ltd., or “IDDC.”¹⁸⁷

88. **LG Electronics Entities:** LG Electronics, Inc., or “LGE” a South Korean entity, is a leading global manufacturer of consumer electronics products including televisions, computers and home appliances. LGE also produces and sells CPTs and CDTs.¹⁸⁸ In 2001 LGEI partnered¹⁸⁹ 50/50 with Koninklijke Philips Electronics N.V. to create LG Philips Displays, “LPD,” which encompassed both founders’ CRT production and sales activities.¹⁹⁰ LG Philips Displays became the independent company LP Displays International, Ltd. on April 1, 2007.¹⁹¹ LGE manufactured, sold and distributed CRTs and CRT Products, independently and through subsidiaries LG Electronics USA, or “LGEUSA,” LG Electronics Taiwan Taipei Co., Ltd., or “LGETT,” LP Displays International, Ltd., or “LP Displays.”
89. **Panasonic Entities:** Panasonic Corporation, known as Matsushita Electric Industrial Co, Ltd., or “MEI,” until 2008,¹⁹² is a Japanese entity most known for its Panasonic brand.¹⁹³ It is also the primary owner of the CRT manufacturing company MT Picture Display Co., Ltd., or “MTPD,” which began in 2003 as a joint venture with

¹⁸⁷ Irico Group Corporation, “About Irico,” 4, <http://www.ch.com.cn/english/txt.jsp?urltype=tree.TreeTempUrl&wbtreeid=1459>.

¹⁸⁸ PHLP-CRT-051982-PHLP-CRT-052085 at 52055-56.

¹⁸⁹ PHLP-CRT-051982-PHLP-CRT-052085 at 51998; A.A.M. Deterink, “Trustee’s First Report in the bankruptcy of LG.Philips Displays Holding B.V. and LG.Philips Displays Netherlands B.V.,” March 1, 2006, 6-8, http://deterinklive.com/nl/download/?file=workspace/uploads/faillissementsverslagen/lg_verslag1en_01032006.pdf.

¹⁹⁰ PHLP-CRT-051982-PHLP-CRT-052085 at 51998 and 52008-52009; Businessweek, “Company Overview of LG Philips Displays Korea Co., Ltd.,” <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=6453976>.

¹⁹¹ Businessweek, “Company Overview of LP Displays,” <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=1492342>; Tarr, Greg, “CRT Maker LG. Philips Displays Changes Names,” *Twice*, March 16, 2007, <http://www.twice.com/news/crt-maker-lgphilips-displays-changes-name-0>.

¹⁹² Matsushita Electric Industrial Co., Ltd., “Form 6-K,” June 02, 2008, 4.

¹⁹³ Panasonic, “Matsushita Electric (Panasonic) and TCL Holdings Sign Collaborative Agreement on Consumer Electronics,” April 9, 2002, <http://panasonic.net/ir/relevant/en020409-4/en020409-4.html>.

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Toshiba Corporation, but which MEI purchased entirely in 2007.¹⁹⁴ MEI sold and distributed CRT Products as well as CRTs.¹⁹⁵ Matsushita Electronics Corporation (Malaysia) Sdn Bhd., or “Matsushita Malaysia,” is a Malaysian subsidiary of MTPD, that sold and distributed MEI-manufactured CRT Products.¹⁹⁶ Panasonic Corporation of North America, or “PCNA,” is an American subsidiary of Panasonic Corporation that sold and distributed CRT Products.¹⁹⁷ Panasonic Consumer Electronics Co., or “PACEC,” is an American division¹⁹⁸ of PCNA that sold and distributed CRT Products.¹⁹⁹

90. **Philips Entities:** Koninklijke Philips Electronics N.V., or “Royal Philips,” is a Dutch electronics company, and co-owner²⁰⁰ of LPD with LG Electronics, as described above. Royal Philips manufactured CRT Products before the joint venture with LG Electronics with CPT sales accounting for a majority of total CRT revenue.²⁰¹ Subsidiaries of Royal Philips that manufactured, sold and distributed CRT Products include Philips Electronics Industries Ltd., or “PEIL,” Philips Electronics North America, or “Philips America,” Philips Consumer Electronics Co., or “PCEC,”

¹⁹⁴ SEC, “Panasonic Corporation: Form 20-F,” March 31, 2011, 25, http://www.sec.gov/Archives/edgar/data/63271/000119312511178201/d20f.htm#rom123323_46; Toshiba, “Closure of MT Picture Display (M) Sdn. Bhd.,” IR News, July 26, 2006, <http://www.toshiba.co.jp/about/ir/en/news/20060726.htm>.

¹⁹⁵ See CHU00028441.01E-CHU00028446E at 28444E and 28446E.

¹⁹⁶ Toshiba, “Closure of MT Picture Display (M) Sdn. Bhd.,” IR News, July 26, 2006, <http://www.toshiba.co.jp/about/ir/en/news/20060726.htm>.

¹⁹⁷ Panasonic USA, “Company Profile,” <http://www.panasonic.com/about/overview.asp>.

¹⁹⁸ Businessweek, “Company Overview of Panasonic Consumer Electronics Company,” <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=7827825>.

¹⁹⁹ Panasonic USA, “Consumer Search Results: “CRT TVs,”” <http://shop.panasonic.com/search/?siteView=DEFAULT&q=crt%20tvs>, accessed January 9, 2012.

²⁰⁰ PHLP-CRT-051982 - PHLP-CRT-052085 at 51998; A.A.M. Deterink, “Trustee’s First Report in the bankruptcy of LG.Philips Displays Holding B.V. and LG.Philips Displays Netherlands B.V.,” March 1, 2006, 6-8, http://deterinklive.com/nl/download/?file=workspace/uploads/faillissementsverslagen/lg_verslag1en_01032006.pdf.

²⁰¹ PHLP-CRT-051982-PHLP-CRT-052085 at 052004 and 052053.

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Philips Electronics Industries (Taiwan), Ltd., or “Philips Taiwan,” and Philips da Amazonia Industria electronic Ltda., or “Philips Brazil.”²⁰²

91. **Samsung Entities:** Samsung Electronics Co., Ltd., or “SEC,” is a South Korean company that manufactured, sold and distributed of CRTs and CRT Products independently and through several subsidiaries including, Samsung Electronics America, Inc., or “SEAI,” Samsung SDI (Malaysia) Sdn Bhd., or “Samsung Malaysia,” Samsung SDI Co., Ltd., “Samsung SDI,” Samsung SDI America, Inc., or “Samsung America,” Samsung SDI Mexico S.A. de C.V., or “Samsung SDI Mexico,” Samsung SDI Brazil Ltd., or “Samsung SDI Brazil,” Shenzhen Samsung SDI Co., Ltd., or “Samsung SDI Shenzhen,” and Tianjin Samsung SDI Co., Ltd., or “Samsung SDI Tianjin.”²⁰³
92. **Thai CRT:** Thai CRT Company, Ltd., or “Thai CRT,” is a Thai CRT manufacturer, and, a subsidiary of Siam Cement Group.²⁰⁴
93. **Toshiba Entities:** Toshiba Corporation, or “TC,” is a Japanese CRT manufacturer and co-owner²⁰⁵ of Matsushita Toshiba Picture Display Co., Ltd., as previously described.²⁰⁶ Toshiba America, Inc., or “Toshiba America,” Toshiba America Consumer Products LLC, or “TACP,” Toshiba America Consumer Products, Inc., or “TACPI,” Toshiba America Electronic Components, Inc., or “TAEP,” and Toshiba

²⁰² Koninklijke Philips Electronics N.V., “Form 20-F: Exhibit 8,” December 31, 2011, 1, 9, 13 and 15, <http://www.sec.gov/Archives/edgar/data/313216/000095012311015455/u10449exv8.htm>.

²⁰³ Samsung Electronics Co., Ltd. and Subsidiaries, “Notes to the Consolidated Financial Statements,” 2012 Quarter 1, 14-18, http://www.samsung.com/us/aboutsamsung/ir/financialinformation/auditedfinancialstatements/download/s/consolidated/2012_con_quarter01_note.pdf. Samsung SDI, “Overseas Plants,” http://www.samsungsdi.com/intro/c_7_2_1_5P.html.

²⁰⁴ The Siam Cement Group, “Thai CRT Co., Ltd. (TCRT) Restructures Ownership,” February 16, 2005, http://www.scg.co.th/en/04investor_governance/03_investors_news/detail.php?ContentId=28.

²⁰⁵ Toshiba, “Closure of MT Picture Display (M) Sdn. Bhd.,” IR News, July 26, 2006, <http://www.toshiba.co.jp/about/ir/en/news/20060726.htm>.

²⁰⁶ Toshiba America, “Inside Toshiba,” http://www.toshiba.com/tai/about_us.jsp; Block, Ryan, “Toshiba killing CRTs and analog tuners,” Engadget, February 21, 2006, <http://www.engadget.com/2006/02/21/toshiba-killing-crts-and-analog-tuners/>; PHLP-CRT-051982-PHLP-CRT-052085 at 52068-52069.

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America Information Systems, Inc., or “TAIP,” are all American subsidiaries that manufactured, sold and distributed CRT Products.²⁰⁷ Toshiba Display Devices (Thailand) Company, Ltd., or “TDDT,” is a Thai subsidiary of TC that sold and distributed CRT Products.²⁰⁸

94. **Thomson:** Technicolor SA, known as Thomson SA until 2010,²⁰⁹ is a French technology company that manufactures products and provides services in the media and entertainment industries.²¹⁰ Thomson sold TVs in the US under the RCA brand.²¹¹ Thomson was a major manufacturer of CRTs for television sets until 2005 when it sold its CPT business.²¹² Most of Thomson’s manufacturing facilities were in low-cost countries such as China, Mexico, Poland and Thailand,²¹³ though it had manufacturing facilities in the US, as well.²¹⁴ A plant in Circleville, Ohio manufactured glass components for television picture tubes from 1987-2004.²¹⁵

²⁰⁷ Toshiba America, “Inside Toshiba,” http://www.toshiba.com/tai/about_us.jsp; Toshiba, “Toshiba in the Americas,” <http://www.toshiba.com/tai/americas/us.jsp>.

²⁰⁸ Toshiba, “Toshiba Display Devices (Thailand) Celebrates 7th Anniversary with Start of Full-Scale Manufacturing of Color Display Tubes,” August 29, 1995, http://www.toshiba.co.jp/about/press/1995_08/pr2901.htm.

²⁰⁹ “Thomson changes name to Technicolor, sells unit to Sony,” *telecompaper*, <http://www.telecompaper.com/news/thomson-changes-name-to-technicolor-sells-unit-to-sony--715404>.

²¹⁰ “Technicolor SA Full Description,” Reuters, <http://www.reuters.com/finance/stocks/companyProfile?symbol=TCLRY.PK>.

²¹¹ John Tagliabue, “Thomson and TCL To Join TV Units,” *The New York Times*, Nov 4, 2003.

²¹² Thomson never had activity in the CDT business. See Thomson, “United States Securities and Exchange Commission: Form 20-F,” Washington, DC, May 6, 2009, 7.

²¹³ Thomson, “United States Securities and Exchange Commission: 2002 Form 20-F,” Washington, DC, May 30, 2003, 43.

²¹⁴ “BEW Members at Thomson Inc. Face Shutdown of TV Tube and Glass Plants,” *IBEW Journal*, May 2004, <http://www.ibew.org/articles/04journal/0405/p11.htm>.

²¹⁵ “RCA Corporation,” Ohio EPA, <http://www.epa.ohio.gov/cdo/rca.aspx>.

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Thomson Inc USA, was incorporated in 1987 and is based in Indiana.²¹⁶ A plant in Marion, Indiana assembled CRTs for Thomson from 1988 – 2004.²¹⁷

95. In 2003, Thomson moved its television production to TCL-Thomson Electronics (TTE), a joint venture with TCL Multimedia Technology Holdings. In early 2005, Thomson sold its Italian CRT plant to Videocon Group and by June 2005, Thomson sold all its CRT activities in China, Mexico and Poland to Videocon.²¹⁸
96. **Mitsubishi:** Mitsubishi Electric is a Japanese corporation with subsidiaries located throughout the world, including the US.²¹⁹ Mitsubishi Electric US Holdings, Inc. (also “Mitsubishi Electric America, Inc.”), the principal subsidiary of Mitsubishi Electric Corporation, is headquartered in Cypress, CA.²²⁰ During the class period, Mitsubishi manufactured CRTs in Mexico and Canada and produced television receivers in the US.²²¹ Starting in 1983 through 1998, Mitsubishi manufactured CPTs in a plant in Canada.²²² Also, from 1998 through 2003, Mitsubishi manufactured CDTs in Mexico through its subsidiary, Mitsubishi Electric America Inc.²²³

²¹⁶ “Company Overview of Technicolor USA, Inc.,” Bloomberg Businessweek, <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=1526194>.

²¹⁷ “BEW Members at Thomson Inc. Face Shutdown of TV Tube and Glass Plants,” IBEW Journal, May 2004, <http://www.ibew.org/articles/04journal/0405/p11.htm>.

²¹⁸ Paul Semenza, “Thomson moving away from CRT TVs, but CRTs sticking around,” *DigiTimes*, July 21, 2005.

²¹⁹ “About Us - Locations Worldwide,” <http://www.mitsubishielectric.com/company/about/locations/index.html>.

²²⁰ “Company Overview of Mitsubishi Electric US Holdings, Inc.,” Bloomberg Businessweek, <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=6450476>.

²²¹ John Kitzmiller, *Industry and Trade Summary Television Picture Tubes and Other Cathode-Ray Tubes*, (USITC Publication 2877, 1995): 4.

²²² Martin Kenney, “The Shifting Value Chain: The Television Industry in North America,” *Locating Global Advantage*, ed. Martin Kenney and Richard Florida (Stanford: Stanford University Press, 2003), 106. “Mitsubishi Electric Corporation – Company Profile, Information, Business Description, History, Background Information on Mitsubishi Electric Corporation,” Reference for Business, <http://www.referenceforbusiness.com/history2/47/Mitsubishi-Electric-Corporation.html>.

²²³ “Mitsubishi Electric To Manufacture CRTs In Mexico Through a New U.S. Subsidiary,” The Free Library, <http://www.thefreelibrary.com/Mitsubishi+Electric+To+Manufacture+CRTs+In+Mexico+Through+a+New+U.S....-a019756115>; “Mitsubishi to close CRT plant,” *Telecompaper*,

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97. **Joint Ventures:** MT Picture Display Co., Ltd., formerly Matsushita Toshiba Picture Display Co., Ltd., or “MTPD,” is a Japanese CRT manufacturer co-owned by Panasonic Corporation and Toshiba.²²⁴ However, MTPD became a full subsidiary of MEI in 2007.²²⁵ Beijing-Matsushita Color CRT Company, Ltd., or “BMCC,” is a Chinese manufacturer of CRTs, founded as a joint venture between Panasonic and Beijing, People’s Republic of China.²²⁶ LG. Philips Displays, or “LPD,” was a joint venture between LGEI and Koninklijke Philips Electronics N.V. as described above. LG. Philips Displays became the independent company LP Displays International, Ltd. on April 1, 2007.²²⁷

<http://www.telecompaper.com/news/mitsubishi-to-close-crt-plant--391794>.

²²⁴ Toshiba, “Closure of MT Picture Display (M) Sdn. Bhd.,” IR News, July 26, 2006, <http://www.toshiba.co.jp/about/ir/en/news/20060726.htm>.

²²⁵ Panasonic Corporation, “Panasonic Form 20-F,” March 31, 2011, http://www.sec.gov/Archives/edgar/data/63271/000119312511178201/d20f.htm#rom123323_46, 24.

²²⁶ Panasonic, “Panasonic History: 1987 Joint Venture Company Beijing established,” <http://panasonic.net/history/corporate/chronicle/1987-01.html>.

²²⁷ Businessweek, “Company Overview of LP Displays,” <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=1492342>; Tarr, Greg, “CRT Maker LG. Philips Displays Changes Names,” *Twice*, March 16, 2007, <http://www.twice.com/news/crt-maker-lgphilips-displays-changes-name-0>.

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APPENDIX B. Competitor Communication About Production

Quarter	Bates Number	Attending or Referenced Manufacturers ¹	Product Type	Production Topic		
				Line Shutdown	Line Reduction	Information Exchange
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. 1995Q3	CHU00028873E	SDI, CPT	CPT			X
2. 1996Q2	CHU00028815E	SDI, CPT	CDT			X
3. 1996Q3	CHU00028803E	SDI, CPT	CPT			X
4. 1996Q4	CHU00028396E	CPT, SDI	CDT			X
5. 1996Q4	CHU00028786E	SDI, CPT, ORION	CDT			X
6. 1996Q4	CHU00028909E	CPT, LG	CDT			X
7. 1997Q1	CHU00028758E	SDI, CPT, HITACHI, LG, ORION, PHILIPS (PH)	CDT		X	
8. 1997Q1	CHU00028760E	SDI, LG, PHILIPS (PH), CPT	CDT			X
9. 1997Q1	CHU00028763E	CPT, SDI	CDT		X	
10. 1997Q1	CHU00028768E	SDI, CPT, PHILIPS (PH), ORION	CDT		X	
11. 1997Q2	CHU00028283E	TOSHIBA, CPT	CDT			X
12. 1997Q2	CHU00028725E	CPT, SDI, PHILIPS (PH), LG	CDT			X
13. 1997Q3	CHU00028707E	SDI, CPT	CDT			X
14. 1997Q4	CHU00020779E	LG, TOSHIBA, THAI-CRT, CPT	CPT			X
15. 1997Q4	CHU00028670E	SDI, CPT	CDT			X
16. 1997Q4	CHU00028674E	SDI, CPT	CDT		X	
17. 1997Q4	CHU00028677E	CPT, SDI	CDT			X
18. 1997Q4	CHU00028691E	SDI, PHILIPS (PH), CPT	CDT			X
19. 1998Q1	CHU00028666E	SDI, CPT	CDT	X		X
20. 1998Q1	CHU00028955E	CPT, ORION	CDT			X
21. 1998Q2	CHU00028642E	CPT, SDI	CDT		X	X
22. 1998Q2	CHU00028952E	CPT, ORION	CDT			X
23. 1998Q2	CHU00028638E	CPT, SDI	BOTH		X	
24. 1998Q3	CHU00029262E	CPT, SDI, LG, ORION, THAI-CRT, TOSHIBA	CPT		X	
25. 1998Q3	CHU00030670E	CPT, SDI, LG, ORION, THAI-CRT	CPT		X	X
26. 1998Q4	CHU00029259E	CPT, SDI, LG, ORION, THAI-CRT	CPT		X	X
27. 1998Q4	CHU00030684E	CPT, PHILIPS (PH), SDI, ORION, BMCC, IRICO	CDT			X
28. 1998Q4	SDCRT-0086434E	SDI, CPT, LG, PHILIPS (PH), ORION	CDT		X	
29. 1998Q4	SDCRT-0086449E	CPT, PHILIPS (PH), ORION, LG, SDI	CDT		X	X
30. 1998Q4	CHU00028532-33E	CPT, MITSUBISHI	BOTH			X
31. 1999Q1	CHU00030731E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	
32. 1999Q1	SDCRT-0086563E	LG, CPT, ORION, SDI, PHILIPS (PH)	CDT		X	X
33. 1999Q1	SDCRT-0086569-70	LG, SDI, ORION, CPT, PHILIPS (PH)	CDT		X	
34. 1999Q2	CHU00029214	CPT, SDI, LG, ORION	CPT		X	
35. 1999Q2	TSB-CRT-00045123	TOSHIBA, CPT	CPT		X	
36. 1999Q2	CHU00030745E	CPT, PHILIPS (PH), SDI, ORION, IRICO, BMCC	CDT			X
37. 1999Q2	CHU00030787E	CPT, SDI, PHILIPS (PH), ORION, LG	CDT		X	
38. 1999Q2	SDCRT-0086593E	CPT, PHILIPS (PH), ORION, LG, SDI	CDT		X	
39. 1999Q2	SDCRT-0086597E	PHILIPS (PH), CPT, SDI, ORION, LG	CDT			X
40. 1999Q2	SDCRT-0086605E	CPT, PHILIPS (PH), ORION, LG, SDI	CDT		X	
41. 1999Q2	SDCRT-0086632E	CPT, PHILIPS (PH), ORION, LG, SDI	CDT		X	X
42. 1999Q2	SDCRT-0086641E	CPT, PHILIPS (PH), ORION, LG, SDI	CDT		X	X
43. 1999Q2	SDCRT-0086584E	SDI, CPT, PHILIPS (PH)			X	X
44. 1999Q3	CHU00029245E	CPT, SDI, LG, ORION, THAI-CRT	CPT			X
45. 1999Q3	CHU00028441E	CPT, MEC	CDT			X
46. 1999Q3	CHU00030809E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	
47. 1999Q3	CHU00030823E	CPT, SDI, BMCC, ORION, IRICO, PHILIPS (PH)	CDT			X
48. 1999Q3	CHU00030835E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	
49. 1999Q3	CHU00030851E	CPT, TOSHIBA	CDT			X
50. 1999Q3	CHU00030855E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	X

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Quarter	Bates Number	Attending or Referenced Manufacturers ¹	Product Type	Production Topic		
				Line Shutdown	Line Reduction	Information Exchange
(1)	(2)	(3)	(4)	(5)	(6)	(7)
51. 1999Q3	SDCRT-0086649E	CPT, LG, PHILIPS (PH), SDI, ORION	CDT		X	
52. 1999Q3	SDCRT-0086672E	PHILIPS (PH), IRICO, SDI, ORION, CPT, BMCC	CDT			X
53. 1999Q3	SDCRT-0086691	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	
54. 1999Q3	SDCRT-0086698E	PHILIPS (PH), ORION, IRICO, CPT, SDI	CDT			X
55. 1999Q3	CHU00029175E	CPT, SDI, LG, ORION, PHILIPS (PH)	BOTH			X
56. 1999Q3	CHU00029179E	CPT, SDI, LG, ORION, THAI-CRT	BOTH			X
57. 1999Q4	CHU00029171E	CPT, SDI, LG, ORION, THAI-CRT	CPT		X	X
58. 1999Q4	CHU00030888E	CPT, SDI, PHILIPS (PH), ORION, LG	CDT			X
59. 1999Q4	SDCRT-0086703E	CPT, PHILIPS (PH), SDI	CDT		X	
60. 2000Q1	CHU00029138E	CPT, SDI, LG, ORION, PHILIPS (PH)	CPT			X
61. 2000Q1	CHU00029144E	CPT, SDI, LG, ORION, PHILIPS (PH), THAI-CRT	CPT			X
62. 2000Q1	CHU00029147E	CPT, SDI, LG, ORION, PHILIPS (PH), THAI-CRT	CPT			X
63. 2000Q1	CHU00030720E	CPT, SDI, PHILIPS (PH), LG, ORION	CDT		X	
64. 2000Q1	CHU00030960E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	X
65. 2000Q1	CHU00030965E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	
66. 2000Q1	CHU00030973E	CPT, SDI, IRICO, PHILIPS (PH)	CDT			X
67. 2000Q1	CHU00030985E	CPT, SDI	CDT	X		
68. 2000Q2	CHU00029110E	CPT, PHILIPS (PH), IRICO	CPT			X
69. 2000Q2	CHU00029131E	CPT, SDI, LG, ORION, PHILIPS (PH)	CPT		X	
70. 2000Q2	CHU00031002E	CPT, SDI, IRICO, BMCC, LG, PHILIPS (PH), ORION	CDT		X	X
71. 2000Q2	CHU00031006E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	
72. 2000Q2	CHU00031010E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	
73. 2000Q3	CHU00029108E	CPT, SDI, LG, ORION, PHILIPS (PH)	CPT			X
74. 2000Q3	CHU00031056E	CPT, SDI, LG, ORION, PHILIPS (PH)	CPT			X
75. 2000Q3	CHU00031040E	CPT, SDI, IRICO, BMCC, LG, PHILIPS (PH), ORION	CDT		X	X
76. 2000Q3	CHU00031044E	CPT, SDI, IRICO, BMCC, LG, PHILIPS (PH), ORION	CDT		X	X
77. 2000Q3	CHU00031047E	CPT, TOSHIBA	CDT			X
78. 2000Q4	CHU00031075E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	X
79. 2000Q4	SDCRT-0087393E-98E	LG, CPT, PHILIPS (PH), ORION, SDI, TOSHIBA	CDT		X	X
80. 2001Q1	SDCRT-0087662E	PHILIPS (PH), THOMSON, SDI, ORION	CPT			X
81. 2001Q1	CHU00031111E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT		X	X
82. 2001Q1	SDCRT-0087405-E07E	CPT, LG, PHILIPS (PH), ORION, SDI	CDT		X	
83. 2001Q2	CHU00036414E	CPT, SDI, LG, ORION	CPT			X
84. 2001Q2	SDCRT-0087340E-42E	BMCC, CPT, LG, IRICO, PHILIPS (PH), THOMSON, SDI, HITACHI	CPT	X	X	X
85. 2001Q2	SDCRT-0087667E	PHILIPS (PH), THOMSON, SDI, ORION	CPT			X
86. 2001Q2	CHU00024554E	SDI, LG, ORION, PHILIPS (PH), CPT	CDT		X	
87. 2001Q2	CHU00031142E	CPT, SDI, LG, ORION, PHILIPS (PH)	CDT	X	X	X
88. 2001Q2	CHU00660306-11E	SDI, LG, ORION, CPT	CDT	X	X	X
89. 2001Q2	CHU00660395	PHILIPS (PH), CPT, LG, ORION, SDI	CDT		X	
90. 2001Q3	CHU00036384E	CPT, SDI, LG, ORION	CPT			X
91. 2001Q3	CHU00036386E	CPT, SDI, LG, ORION, THAI-CRT	CPT		X	X
92. 2001Q3	SDCRT-0087664	PHILIPS (PH), THOMSON, SDI, ORION	CPT		X	
93. 2001Q3	CHU00031150E	CPT, SDI, LG, ORION	CDT		X	X
94. 2001Q3	CHU00660408-418	SDI, LG, ORION, CPT, PHILIPS (PH)	CDT	X	X	
95. 2001Q3	CHU00660454	SDI, LG, PHILIPS (PH), ORION, CPT	CDT	X	X	
96. 2001Q4	CHU00036390E	CPT, SDI, LG, ORION	CPT		X	
97. 2001Q4	CHU00036408E	CPT, SDI, LPD, ORION	CPT			X
98. 2001Q4	CHU00028589E	CPT, SDI, LPD			X	
99. 2002	CHU00660369	LPD, SDI, ORION, CPT	CDT			X
100. 2002Q1	CHU00036392E	CPT, SDI, LPD, ORION	CPT			X
101. 2002Q1	CHU00036394E	CPT, SDI, LPD, ORION	CPT			X
102. 2002Q1	CHU00660419-425	SDI, LPD, ORION, CPT	CDT	X		
103. 2002Q2	CHU00660373-382	CPT, LPD, ORION, SDI	CPT		X	
104. 2002Q3	CHU00660468-475	CPT, LPD, ORION, SDI	CDT			X
105. 2002Q3	CHU00660487-500	CPT, LPD, SDI, ORION	CDT	X		X
106. 2002Q3	CHU00660194E	SDI, LPD, ORION	BOTH			X
107. 2002Q4	CHU00125162E	SDI, LPD, CPT	CPT			X
108. 2002Q4	SDCRT-0006632E-33E	SDI, THOMSON, ORION	CPT			X
109. 2002Q4	CHU00660476-486	CPT, LPD, SDI, ORION, TOSHIBA	CDT			X
110. 2002Q4	SDCRT-0087427-29	CPT, ORION, SDI, LPD	CDT			X

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Quarter	Bates Number	Attending or Referenced Manufacturers ¹	Product Type	Production Topic		
				Line Shutdown	Line Reduction	Information Exchange
(1)	(2)	(3)	(4)	(5)	(6)	(7)
111. 2003Q1	CHU00020661E	CPT, THAI-CRT, MEC, TOSHIBA	CDT			X
112. 2003Q1	CHU00031804E	CPT, SDI	CDT	X		
113. 2003Q1	SDCRT-0006041E	SDI, MITSUBISHI	CDT			X
114. 2003Q2	CHU00030547E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
115. 2003Q2	MTPD-0423675E	SDI, MTPD, LPD	CPT			X
116. 2003Q2	SDCRT-0088635_CT_715E	LPD, SDI, CPT, THAI-CRT, TOSHIBA	CPT			X
117. 2003Q2	CHU00660213E	LPD, SDI, CPT	CDT	X		X
118. 2003Q2	CHU00660539-548	CPT, LPD, SDI	CDT	X	X	
119. 2003Q2	CHU00660549-560	CPT, LPD, SDI	CDT	X	X	X
120. 2003Q2	CHU00660561-574	CPT, LPD, SDI	CDT	X		
121. 2003Q3	MTPD-0576483E	TOSHIBA, MTPD, THOMSON	CPT			X
122. 2003Q3	CHU00031190E	CPT, LPD, SDI	CDT	X		X
123. 2003Q3	CHU00031194E	CPT, LPD, SDI	CDT	X		X
124. 2003Q3	CHU00660575-585	CPT, LPD, SDI	CDT	X	X	
125. 2003Q3	CHU00660586-593	CPT, LPD, SDI	CDT	X	X	
126. 2003Q3	CHU00660594-605	CPT, LPD, SDI	CDT	X	X	
127. 2003Q3	CHU00660606-615	CPT, LPD, SDI	CDT	X	X	
128. 2003Q4	CHU00030071E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
129. 2003Q4	SDCRT-0088635	LPD, SDI, THOMSON	CPT		X	
130. 2003Q4	SDCRT-0088635_CT_839	SDI, LPD, CPT	CPT			X
131. 2003Q4	CHU00031214E	CPT, LPD, SDI	CDT	X		
132. 2003Q4	CHU00031221E	CPT, LPD, SDI	CDT	X		X
133. 2003Q4	CHU00660633-643	CPT, LPD, SDI	CDT	X		
134. 2003Q4	CHU00660644-655	CPT, LPD, SDI	CDT	X		
135. 2003Q4	CHU00660656-662	CPT, LPD, SDI	CDT	X		
136. 2004Q1	CHU00030036E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
137. 2004Q1	MTPD-0423651E	CPT, SDI, MTPD, THAI-CRT, LPD	CPT			X
138. 2004Q1	CHU00031227E	CPT, LPD, SDI	CDT	X		
139. 2004Q1	CHU00660663-670	CPT, LPD, SDI	CDT	X		
140. 2004Q1	SDCRT-0088846	CPT, LPD, SDI	CDT	X		
141. 2004Q2	CHU00030005E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
142. 2004Q2	CHU00030530E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
143. 2004Q2	MTPD-0426088E	SDI, LPD, CPT, THAI-CRT, MTPD	CPT			X
144. 2004Q2	CHU00030020E	CPT, MTPD, SDI, LPD, THAI-CRT	BOTH			X
145. 2004Q3	CHU00030506E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
146. 2004Q3	MTPD-0607598	MTPD, LPD, SDI	CPT			X
147. 2004Q3	CHU00660717-727	CPT, LPD, SDI	CDT	X	X	
148. 2004Q3	CHU00660728-735	CPT, LPD, SDI	CDT	X		
149. 2004Q3	SDCRT-0090328	CPT, LPD, SDI	CDT		X	
150. 2004Q3	SDCRT-0090339-44	SDI, LPD, CPT	CDT	X		
151. 2004Q4	CHU00029999E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
152. 2004Q4	MTPD-0580798	MTPD, LPD, SDI	CPT			X
153. 2004Q4	SDCRT-0090197E	LPD, CPT, MTPD, THAI-CRT, SDI	CPT			X
154. 2004Q4	CHU00071480E	CPT, LPD, SDI	CDT	X		
155. 2004Q4	CHU00660736-740	CPT, LPD, SDI	CDT	X		
156. 2004Q4	SDCRT-0090233	CPT, LPD, SDI	CDT	X		
157. 2004Q4	SDCRT-0090233_CT_355E	SDI, LPD, CPT	CDT			X
158. 2005Q1	SDCRT-0091353E	LPD, MTPD, SDI	CPT			X
159. 2005Q1	SDCRT-0091491-504	THOMSON, LPD, SDI	CPT		X	
160. 2005Q1	CHU00647932-943	CPT, LPD, SDI	CDT	X		
161. 2005Q1	SDCRT-0091027_616E	CPT, LPD, SDI	CDT	X	X	
162. 2005Q1	SDCRT-0091599E	CPT, LPD, SDI	CDT	X		X

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Quarter	Bates Number	Attending or Referenced Manufacturers ¹	Product Type	Production Topic		
				Line Shutdown	Line Reduction	Information Exchange
(1)	(2)	(3)	(4)	(5)	(6)	(7)
163. 2005Q1	SDCRT-0091605-15	CPT, LPD, SDI	CDT	X		
164. 2005Q2	CHU00029971E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
165. 2005Q2	CHU00030497E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
166. 2005Q2	MTPD-0400573	MTPD, LPD, SDI	CPT			X
167. 2005Q2	SDCRT-0091364E	LPD, MTPD, CPT, THAI-CRT, SDI	CPT			X
168. 2005Q2	SDCRT-0091372E	LPD, MTPD, CPT, THAI-CRT, SDI	CPT			X
169. 2005Q2	SDCRT-0091374E	LPD, MTPD, CPT, THAI-CRT, SDI	CPT			X
170. 2005Q2	CHU00014204E	CPT, LPD, SDI	CDT	X		
171. 2005Q2	SDCRT-0091634	CPT, LPD, SDI	CDT	X		
172. 2005Q2	SDCRT-0091643E-47E	CPT, LPD, SDI	CDT	X		X
173. 2005Q2	SDCRT-0091661-67	CPT, LPD, SDI	CDT	X		X
174. 2005Q3	MTPD-0423645	MTPD, LPD, SDI	CPT			X
175. 2005Q4	CHU00030468E	CPT, MTPD, SDI, LPD, THAI-CRT	CPT			X
176. 2005Q4	SDCRT-0091400E	LPD, MTPD, CPT, THAI-CRT, SDI	CPT			X
177. 2005Q4	CHU00014218E	LPD, CPT, SDI, ORION	CDT			X
178. 2006Q1	MTPD-0580821	MTPD, LPD, SDI	CPT			X
179. 2006Q4	CHU00102752E	CPT, BMCC, IRICO, LPD, SDI, THOMSON, HITACHI	CPT			X

¹Attending manufacturer when available. If not listed, referenced manufacturers were used.



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EDUCATION

Ph.D., Economics, University of California, Los Angeles
M.A., Economics, University of California, Los Angeles
B.S., Economics, Santa Clara University

WORK EXPERIENCE

Econ One Research, Inc., President, July 1997 to date
Founded *Econ One Research, Inc.*, 1997

Micronomics, Inc., President and CEO, 1994-1997
Micronomics, Inc., Executive Vice President, 1988-1994
Cofounded *Micronomics, Inc.*, 1988

National Economic Research Associates, Inc. 1980-1988
(Last position was Senior Vice President and member of the Board of Directors)

California State University, Northridge, Lecturer, 1979-1980

AREAS OF EXPERTISE

Has offered expert testimony regarding:

- Competition economics
- Commercial damages
- Econometrics and statistics
- Intellectual property
- Valuation

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Managing Director

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INVITED PRESENTATIONS

Corporations & Cartels: Should You Be A Plaintiff?, *American Bar Association*, 62nd Antitrust Law Spring Meeting, March 2014.

Developments in Antitrust Cases Alleging Delayed Generic Competition in the Pharmaceutical Industry, *American Antitrust Institute*, 5th Annual Future of Private Antitrust Enforcement Conference, December 2011.

Class Certification and Calculation of Damages, *American Bar Association*, Section of Antitrust Law and *International Bar Association*, 8th International Cartel Workshop, February 2010.

Class Certification Discussion and Demonstration, *American Bar Association*, Section of Antitrust Law, The Antitrust Litigation Course, October 2007.

Antitrust Injury and the Predominance Requirement in Antitrust Class Actions, *American Bar Association*, Houston Chapter, April 2007.

Class Certification Discussion and Demonstration, *American Bar Association*, Section of Antitrust Law, The Antitrust Litigation Course, October 2005.

What Can an Economist Say About The Presence of Conspiracy?, *American Bar Association*, Antitrust Law, The Antitrust Litigation Course, October 2003.

Lessons From Gas Deregulation, *International Association for Energy Economics*, Houston Chapter, December 2002.

A Retrospective Look at Wholesale Gas Industry Restructuring, *Center for Research in Regulated Industries*, 20th Annual Conference of the Advanced Workshop in Regulation and Competition, May 2001.

The Economic Analysis of Intellectual Property Damages, *American Conference Institute*, 6th National Advanced Forum, January 2001.

Law and Economics of Predatory Pricing Under Federal and State Law, *Golden State Antitrust and Unfair Competition Law Institute*, 8th Annual Meeting, October 2000.

Non-Price Predation--Some New Thinking About Exclusionary Behavior, *Houston Bar Association*, Antitrust and Trade Regulation Section, October 2000.

After the Guilty Plea: Does the Defendant Pay the Price in the Civil Damage Action, *American Bar Association*, Section of Antitrust Law, 48th Annual Spring Meeting, April 2000.

Economics of Restructuring in Gas Distribution, *Center for Research in Regulated Industries*, 12th Annual Western Conference, July 1999.

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INVITED PRESENTATIONS (cont'd.)

A Basic Speed Law for the Information Superhighway, *California State Bar Association*, December 1998.

Innovation in Regulation, *Center for Research in Regulated Industries*, 11th Annual Western Conference, July/September 1998.

Electric Industry Deregulation: What Does The Future Hold?, *Los Angeles Headquarters Association*, November 1996.

Why Deregulate Electric Utilities?, *National Association of Regulatory Utility Commissioners*, November 1995.

Restructuring U.S. Power Markets: What Can the Gas Industry's Experience Tell Us?, *National Association of Regulatory Utility Commissioners*, July 1995.

Natural Gas Restructuring: Lessons for Electric Utilities and Regulators, *International Association for Energy Economics*, May 1995.

Techniques in the Direct and Cross-Examination of Economic, Financial, and Damage Experts, *The Antitrust and Trade Regulation Law Section of the State Bar of California and The Los Angeles County Bar Association*, 2nd Annual Golden State Antitrust and Trade Regulation Institute, October 1994.

Demonstration: Deposition of Expert Witnesses and Using Legal Technology, *National Association of Attorneys General*, 1994 Antitrust Training Seminar, September 1994.

Direct and Cross Examination of Financial, Economic, and Damage Experts, *The State Bar of California, Antitrust and Trade Regulation Law Section*, May 1994.

Price Premiums in Gas Purchase Contracts, *International Association for Energy Economics*, October 1992.

Valuing Water Supply Reliability, *Western Economic Association*, Natural Resources Section, July 1992.

Transportation Services After Order 636: "Back to the Future" for Natural Gas, Seminar sponsored by Jones, Day, Reavis & Pogue, May 1992.

The Cost of An Unreliable Water Supply for Southern California, Forum presented by Micronomics, Inc., May 1991.

Market Definition: It's Time for Some "New Learning", *Los Angeles County Bar Association*, Antitrust and Corporate Law Section, December 1989.

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INVITED PRESENTATIONS (cont'd.)

Market Definition in Antitrust Cases: Some New Thinking, *Oregon State Bar, Antitrust Law Section*, March 1987.

Future Directions for Antitrust Activity in the Natural Gas Industry, *International Association of Energy Economists*, February 1987.

Information Externalities in Oil and Gas Leasing, *Western Economic Association Meetings*, Natural Resources Section, July 1983.

Economic Analysis of Offshore Oil and Gas Leasing, *Western States Land Commissioners Association*, December 1982.

PUBLISHED ARTICLES

"The Predominance Requirement for Antitrust Class Actions--Can Relevant Market Analysis Help?," *American Bar Association, Section of Antitrust Law, Economics Committee Newsletter*, Volume 7, No. 1, Spring 2007.

"Gas Line Economic?," *Petroleum News*, Volume 11, No. 25, June 2006.

"A Retrospective Look at Wholesale Gas: Industry Restructuring," *Journal of Regulatory Economics*, January 2002.

"Balance Needed in Operating Agreements as Industry's Center of Gravity Shifts to State Oil Firms," *Oil & Gas Journal*, October 2000.

"What Can We Expect From Restructuring In Natural Gas Distribution?" *Energy Law Journal*, January 2000.

"Gas Experience Can Steer Power Away from Deregulation Snags," *Oil & Gas Journal*, August 1996.

"Anatomy of FERC Order 636: What's out, What's in," *Oil & Gas Journal*, June 1992.

"Antitrust II – Future Direction for Antitrust in the Natural Gas Industry," *Natural Gas*, November 1987.

"Information Externalities in Oil and Gas Leasing," *Contemporary Policy Issues*, March 1984.

"Regression Analysis in Antitrust Cases: Opening the Black Box," *Philadelphia Lawyer*, July 1983.

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PUBLISHED ARTICLES (cont'd.)

"Foreign Competition in Antitrust Law," *The Journal of Law & Economics*, April 1983.

REGULATORY SUBMISSIONS

In the Matter of the Application of Southern California Gas Company Regarding Year Six (1999-2000) Under its Experimental Gas Cost Incentive Mechanism and Related Gas Supply Matters; A.00-06-023, Public Utilities Commission of the State of California, November 2001.

Sempra Energy and KN Energy, Incorporation; Docket No. EC99-48-000 (Affidavit and Verified Statement), Federal Energy Regulatory Commission, March/May 1999.

Rulemaking on the Commission's Own Motion to Assess and Revise the Regulatory Structure Governing California's Natural Gas Industry (Market Conditions Report), Public Utilities Commission of the State of California, July 1998.

In the Matter of the Application of Pacific Enterprises, Enova Corporation, et al. for Approval of a Plan of Merger Application No. A. 96-10-038, Public Utilities Commission of the State of California, August/October 1997.

In re: Koch Gateway Pipeline Company; Docket No. RP 97-373-000, Federal Energy Regulatory Commission, May/October 1997 and February 1998.

In the Matter of the Application of Sadlerochit Pipeline Company for a Certificate of Public Convenience and Necessity; Docket No. P-96-4, Alaska Public Utilities Commission, May 1996.

Public Funding of Electric Industry Research, Development, and Demonstration (RD&D) Under Partial Deregulation, California Energy Commission, January 1995.

NorAm Gas Transmission Company; Docket No. RP94-343-000, Federal Energy Regulatory Commission, August 1994/June 1995.

Natural Gas Vehicle Program; Investigation No. 919-10-029, California Public Utilities Commission, July 1994.

Transcontinental Gas Pipe Line Corporation; Docket No. RP93-136-000 (Proposed Firm-to-the-Wellhead Rate Design), Federal Energy Regulatory Commission, January 1994.

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REGULATORY SUBMISSIONS (cont'd.)

In re: Sierra Pacific's Proposed Nomination for Service on Tuscarora Gas Pipeline; Docket No. 93-2035, The Public Service Commission of Nevada, July 1993.

Employment Gains in Louisiana from Entergy-Gulf States Utilities Merger, Louisiana Public Utilities Commission, December 1992.

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Proceeding	Court/Commission/Agency	Docket or File	Deposition/ Trial/Hearing	Date	On Behalf Of
1. <u>In Re: Flonase Direct Purchaser Antitrust Litigation</u>	U.S. District Court, Eastern District of Pennsylvania	Case No. 2:08-CV-03149	Deposition Deposition	March 2010 March 2012	Plaintiff Plaintiff
2. <u>In Re: Wellbutrin XL Antitrust Litigation</u>	U.S. District Court, Eastern District of Pennsylvania	Case No. 2:08-CV-2431	Deposition Hearing Deposition	March 2010 April 2011 November 2011	Plaintiff Plaintiff Plaintiff
3. <u>CNA Holdings, Inc. and Celanese Americas Corporation v. Kaye Scholer, LLP and Robert A. Bernstein</u>	U.S. District Court, Southern District of New York	No. 08 CV 5547 (NRB)	Deposition	December 2010	Counterclaim-Defendant
4. <u>Neon Enterprise Software, LLC v. International Business Machines Corporation</u>	U.S. District Court, Western District of Texas, Austin Division	No. 1:09-CV-00896-JRN	Deposition	April 2011	Plaintiff
5. <u>State of Iowa v. Abbott Laboratories, et al. and The City of New York, et al. v. Abbott Laboratories, Inc., et al.</u>	U.S. District Court, District of Massachusetts	No. 01-CV-12257-PBS	Deposition	May 2011	Plaintiff
6. <u>King Drug Company of Florence, Inc., et al. v. Cephalon, Inc., et al.</u>	U.S. District Court, Eastern District of Pennsylvania	No. 06-CV-1797-MSG	Deposition Deposition Deposition	August 2011 February 2014 July 2014	Plaintiff Plaintiff Plaintiff
7. <u>Rochester Drug Co-Operative, Inc., at al. v. Braintree Laboratories</u>	U.S. District Court, District of Delaware	Case No. 07-142 (SLR)	Deposition	October 2011	Plaintiff

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Proceeding	Court/Commission/Agency	Docket or File	Deposition/ Trial/Hearing	Date	On Behalf Of
8. <u>In Re: Wholesale Grocery Products Antitrust Litigation</u>	U.S. District Court, District of Minnesota	Civil Action No. 09-md-02090 ADM/AJB	Deposition Hearing	December 2011 May 2012	Plaintiff Plaintiff
9. <u>Altana Pharma AG, and Wyeth v. Teva Pharmaceuticals USA, Inc. and Teva Pharmaceutical Industries, Ltd.</u>	U.S. District Court, District of New Jersey	Civil Action No. 04-2355; 05-1966; 05-3920; 06-3672; 08-2877; (JLL) (CCC) on all	Deposition Trial	June 2012 June 2013	Defendant Defendant
10. <u>Apotex, Inc. and Apotex, Corp. v. Sanofi-Aventis, Sanofi-Synthelabo, Inc., Bristol-Myers Squibb Company and Bristol-Myers Squibb Sanofi Pharmaceuticals Holding Partnership</u>	Circuit Court, Broward County, Florida, 17 th Judicial Circuit	No. 11-001243	Deposition Trial	July 2012 March 2013	Plaintiff Plaintiff
11. <u>In Re: AndroGel Antitrust Litigation</u>	U.S. District Court, Northern District of Georgia	No. 1:09-MD-2084-TWT	Deposition	July 2012	Plaintiff
12. <u>Tyco Healthcare Group LP, and Mallinckrodt, Inc. v. Pharmaceutical Holdings Corporation, et al.</u>	U.S. District Court, District of New Jersey	Civil Action No. 07-CV-1299 (SRC)(MAS)	Deposition	August 2012	Plaintiff

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Proceeding	Court/Commission/Agency	Docket or File	Deposition/ Trial/Hearing	Date	On Behalf Of
13. <u>Allergan, Inc., et al. v. Athena Cosmetics, Inc., et al.</u>	U.S. District Court, Central District of California, Southern Division	Case No. SACV07-1316 JVS (RNBx); Case No. SACV09-0328 JVS (RNBx)	Deposition	February 2013	Defendant
14. <u>Mylan Pharmaceuticals, Inc., et al. v. Warner Chilcott Public Limited Company, et al.</u>	U.S. District Court, Eastern District of Pennsylvania	CIV No. 12-3824	Deposition	May 2013	Plaintiff
15. <u>In Re: Polyurethane Foam Antitrust Litigation</u>	U.S. District Court, Northern District of Ohio	Case No. 10-MD-2196	Deposition Deposition Deposition Deposition	July 2013 January 2014 April 2014 July 2014	Plaintiff Plaintiff Plaintiff Plaintiff
16. <u>Marchbanks Truck Service, Inc. d/b/a Bear Mountain Travel Stop, et al., v. Comdata Network, Inc. d/b/a Comdata Corporation, et al.</u>	U.S. District Court, Eastern District of Pennsylvania	No. 07-1078-JKG	Deposition	August 2013	Plaintiff
17. <u>Astrazeneca AB, Aktiebolaget Hässle, KBI-E Inc., KBI Inc., and Astrazeneca, LP v. Apotex Corp., Apotex Inc. and Torpharm, Inc.</u>	U.S. District Court, Southern District of New York	Civil Action No. 01-CIV-9351 (BSJ)	Deposition Trial	August 2013 November 2013	Defendant Defendant

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Proceeding	Court/Commission/Agency	Docket or File	Deposition/ Trial/Hearing	Date	On Behalf Of
18. <u>In re: Cathode Ray Tube (CRT) Antitrust Litigation</u>	U.S. District Court, Northern District of California, San Francisco Division	Case No. 3:07-CV-5944 SC	Deposition	August 2013	Plaintiff
19. <u>In re: Prograf Antitrust Litigation</u>	U.S. District Court, District of Massachusetts	Case No. 1:11-cv-10344-RWZ	Deposition	November 2013	Plaintiff
20. <u>The Shane Group, Inc., et al., v. Blue Cross Blue Shield of Michigan</u>	U.S. District Court, Eastern District of Michigan, Southern Division	No. 2:10-cv-14360-DPH-MKM	Deposition	December 2013	Plaintiff
21. <u>Adriana M. Castro, M.D., P.A. and Sugartown Pediatrics, LLC, et al. v. Sanofi Pasteur, Inc.</u>	U.S. District Court, District of New Jersey	Action No. #11-CV-07178-JLL	Deposition	September 2014	Plaintiff

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Pleadings and Orders**Date**

Direct Purchaser Plaintiffs' Complaint Against Mitsubishi and Thomson

05/05/14

Correspondence**Date**Hitachi

Letter from J. Clayton Everett, Jr. to Jennie Lee Anderson

04/29/11

Letter from Michelle Park Chiu to Jennie Lee Anderson

03/09/12

LG Electronics

Letter from Wilson Mudge to R. Alexander Saveri

07/26/11

Letter from Wilson Mudge to Gary L. Specks and Lauren C. Russell

07/20/12

Panasonic Entities

Letter from Adam C. Hemlock to Geoff Rushing and Lauren Russell

06/01/11

Letter from Adam C. Hemlock to Michael Christian

05/04/12

Samsung

Letter from Michael W. Scarborough to R. Alexander Saveri and Paul H. McVoy

08/12/11

Letter from Benjamin G. Bradshaw to Sylvie K. Kern

03/16/12

Letter from Benjamin G. Bradshaw to R. Alexander Saveri

04/09/12

Toshiba

Letter from Dana Foster to Lauren C. Russell and R. Alexander Saveri

03/23/12

Letter from Dana Foster to Lauren C. Russell and R. Alexander Saveri

05/03/12

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<u>Depositions and Exhibits</u>	<u>Date</u>
Chun-Liu, Chih (Volume 1 and 2)	02/19/13
De Moor, Roger	07/31/12
Heinecke, Jay Alan	07/31/12
Heiser, Thomas L.	07/03/12
Kobayashi, Nobuhiko	07/17/12
Kwon, Kyung Tae	07/13/12
Lee, Jaein (Volume 1 and 2)	06/06/12
Lee, Jaein	07/24/13
Lee, Yun Seok	07/11/12
Seong, Mok Hyeon	07/09/12
Takeda, Yasu Hisa	07/12/12
Tobinaga, Tatsuo	07/16/12
Uchiyama, Yoshiaki	08/01/12
Whalen, William Allen	08/23/12

<u>Expert Reports</u>	<u>Date</u>
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TT Electronics, "About Us," <http://www.ttelectronics.com/about/>.

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U.S. Department of Labor, Bureau of Labor Statistics' Producer Price Index for "Machine-made pressed and blown lighting, automotive, and electronic glassware."

Video Electronics Standards Association, "VESA and Industry Standards and Guidelines for Computer Display Monitor Timing (DMT), Version 1.0, Revision 11," May 1, 2007, ftp://ftp.cis.nctu.edu.tw/pub/csie/Software/X11/private/VeSaSpEcS/VESA_Document_Center_Monitor_Interface/DMTv1r11.pdf.

Weber, Austin, "Outsourcing's Alphabet Soup," Assembly Magazine, February 1, 2003, p.8, <http://www.assemblymag.com/articles/82852-outsourcing-s-alphabet-soup>.

Documents

Beijing-Matsushita Color CRT Company, Ltd.

BMCC-CRT000006384
 BMCC-CRT000057539

11/6/2014

Exhibit 2
List of Materials Relied Upon

Chunghwa

CHU00005997E	
CHU00014200.01E	- CHU00014201E
CHU00014204E	
CHU00014210E	
CHU00014218E	
CHU00014230.01E	- CHU00014231.02E
CHU00017037E	
CHU00020661E	
CHU00020779E	
CHU00021268.01E	- CHU00021271E
CHU00022696.01E	- CHU00022696.02E
CHU00022724E	
CHU00022728E	
CHU00022738E	
CHU00024554E	
CHU00024560E	
CHU00028209E	
CHU00028240E	
CHU00028254.01E	- CHU00028256E
CHU00028283E	
CHU00028297E	- CHU00028298E
CHU00028385E	
CHU00028396.01E	- CHU00028397E
CHU00028424	
CHU00028434E	
CHU00028441.01E	- CHU00028446E
CHU00028532E	- CHU00028533E
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CHU00028558E	
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CHU00028606E	
CHU00028638E	
CHU00028642E	
CHU00028645E	
CHU00028647.01E	- CHU00028647.02E
CHU00028654E	

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Exhibit 2
List of Materials Relied Upon

CHU00028663E
CHU00028666E - CHU00028667E
CHU00028668E

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Exhibit 2
List of Materials Relied Upon

CHU00028670E	
CHU00028674E	
CHU00028677E	
CHU00028685E	- CHU00028686E
CHU00028687E	- CHU00028688E
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CHU00028691E	
CHU00028698E	
CHU00028701E	
CHU00028707E	
CHU00028711E	
CHU00028713E	
CHU00028725.01E	- CHU00028727E
CHU00028728E	
CHU00028730E	
CHU00028740E	
CHU00028746E	
CHU00028752.01E	- CHU00028754E
CHU00028758E	
CHU00028760.01E	- CHU00028762E
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CHU00028786E	
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CHU00028909E	
CHU00028952E	
CHU00028955E	
CHU00028958E	
CHU00028959E	

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Exhibit 2
List of Materials Relied Upon

CHU00028968.01E	- CHU00028969E
CHU00028975E	
CHU00029046E	
CHU00029062E	
CHU00029065E	
CHU00029105E	
CHU00029108E	
CHU00029110E	
CHU00029116E	
CHU00029131.01E	- CHU00029137E
CHU00029138.01E	- CHU00029143E
CHU00029144.01E	- CHU00029146.02E
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CHU00030005E	
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CHU00030036E	
CHU00030071E	
CHU00030410E	

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List of Materials Relied Upon

CHU00030414E	
CHU00030426E	
CHU00030449	- CHU00030457E
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CHU00030505E	
CHU00030506E	
CHU00030530E	
CHU00030547E	
CHU00030559	
CHU00030665E	
CHU00030670E	
CHU00030684E	
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CHU00030701	
CHU00030717E	
CHU00030720E	
CHU00030731E	
CHU00030745E	
CHU00030763E	- CHU00030765E
CHU00030766E	
CHU00030777	
CHU00030787.01E	- CHU00030794E
CHU00030797E	
CHU00030807.01E	- CHU00030815E
CHU00030819E	
CHU00030823E	
CHU00030827E	
CHU00030831E	
CHU00030835E	
CHU00030851E	
CHU00030855E	

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List of Materials Relied Upon

CHU00030888.01E	- CHU00030893.02E
CHU00030899.01E	- CHU00030903E
CHU00030916.01E	- CHU00030916.02E
CHU00030917E	
CHU00030960E	
CHU00030965E	
CHU00030973E	
CHU00030985E	
CHU00031002E	
CHU00031006E	
CHU00031010E	
CHU00031013E	
CHU00031018E	
CHU00031040E	
CHU00031044E	
CHU00031047E	
CHU00031051E	
CHU00031056E	
CHU00031075.01E	- CHU00031087E
CHU00031111.01E	- CHU00031112.02E
CHU00031113E	
CHU00031123	
CHU00031142E	
CHU00031150E	
CHU00031174.01E	- CHU00031175.02E
CHU00031176.01E	- CHU00031176.02E
CHU00031180E	
CHU00031190E	
CHU00031194E	
CHU00031202E	
CHU00031214E	
CHU00031221E	
CHU00031227E	
CHU00031240.01E	- CHU00031247E
CHU00031248E	

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List of Materials Relied Upon

CHU00031249.01E	- CHU00031252E
CHU00031253E	
CHU00031279E	
CHU00031804E	
CHU00036384.01E	- CHU00036385E
CHU00036386E	
CHU00036390E	
CHU00036392E	
CHU00036394.01E	- CHU00036395.02E
CHU00036408.01E	- CHU00036409.02E
CHU00036414E	
CHU00071226	
CHU00071480E	
CHU00100529	- CHU00100530
CHU00102752E	
CHU00123358E	- CHU00123361.02E
CHU00123375E	
CHU00123393E	
CHU00123530E	
CHU00123742E	
CHU00124103	
CHU00124930	
CHU00125162E	
CHU00125257	- CHU00125292
CHU00125374	
CHU00154037	- CHU00154420
CHU00281352	- CHU00281923
CHU00375118E	
CHU00442517	- CHU00442518
CHU00548418E	
CHU00608095	- CHU00608105
CHU00647932	- CHU00647943
CHU00660194E	
CHU00660213E	

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Exhibit 2
List of Materials Relied Upon

CHU00660217E	
CHU00660247E	
CHU00660306E	- CHU00660311E
CHU00660366E	
CHU00660369	
CHU00660373	- CHU00660382
CHU00660383	- CHU00660394
CHU00660395	
CHU00660408	- CHU00660418
CHU00660419	- CHU00660425
CHU00660426	- CHU00660435
CHU00660436	
CHU00660446	
CHU00660454	
CHU00660468	- CHU00660475
CHU00660476	- CHU00660486
CHU00660487	- CHU00660500
CHU00660515	- CHU00660522
CHU00660539	- CHU00660548
CHU00660549	- CHU00660560
CHU00660561	- CHU00660574
CHU00660575	- CHU00660585
CHU00660586	- CHU00660593
CHU00660594	- CHU00660605
CHU00660606	- CHU00660615
CHU00660633	- CHU00660643
CHU00660644	- CHU00660655
CHU00660656	- CHU00660662
CHU00660663	- CHU00660670
CHU00660671	
CHU00660681	- CHU00660692
CHU00660717	
CHU00660728	
CHU00660736	
CHU00732816E	

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Exhibit 2
List of Materials Relied Upon

CHU00732831E	
CHWA00062147	- CHWA00062569
CHWA00088192	- CHWA00088762
CHWA00106460	- CHWA00106757
CHWA00226236	- CHWA00226269

Hitachi

HDP-CRT00025921

LG Electronics

EIN0017699	- EIN0018075
LGE00081653	

Mitsubishi

ME00131622E

MT Picture Display Co., Ltd.

MTPD-0223790E
MTPD-0343949E
MTPD-0400554
MTPD-0400573
MTPD-0400578
MTPD-0400580E
MTPD-0400597
MTPD-0416090
MTPD-0423645
MTPD-0423651E

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Exhibit 2
List of Materials Relied Upon

MTPD-0423668
MTPD-0423675E - MTPD-0423677E
MTPD-0426088E
MTPD-0468631
MTPD-0479714
MTPD-0479726E
MTPD-0483335
MTPD-0493552
MTPD-0517933
MTPD-0575968
MTPD-0576483E
MTPD-0580726
MTPD-0580737
MTPD-0580741
MTPD-0580751E
MTPD-0580775
MTPD-0580795
MTPD-0580798
MTPD-0580812
MTPD-0580821
MTPD-0607571E
MTPD-0607585
MTPD-0607598

Philips

PHLP-CRT-014823
PHLP-CRT-051982 - PHLP-CRT-052085
PHLP-CRT-089918

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Exhibit 2
List of Materials Relied Upon

Samsung

SDCRT-0002283	- SDCRT-0002362
SDCRT-0002984	
SDCRT-0003084	
SDCRT-0005830	
SDCRT-0005831	
SDCRT-0006041E	
SDCRT-0006632E	- SDCRT-0006633E
SDCRT-0006903E	
SDCRT-0007239_CT	
SDCRT-0007580	
SDCRT-0007588-0091718	
SDCRT-0021278	
SDCRT-0063870	
SDCRT-0068880	- SDCRT-0069081
SDCRT-0080694E	- SDCRT-0080696E
SDCRT-0086230E	- SDCRT-0086249E
SDCRT-0086238	
SDCRT-0086256E	- SDCRT-0087004E
SDCRT-0086557	
SDCRT-0087007	- SDCRT-0087440
SDCRT-0087393	
SDCRT-0087441	- SDCRT-0087740
SDCRT-0087662E	
SDCRT-0087667E	
SDCRT-0087694E	- SDCRT-0087698E
SDCRT-0087705E	- SDCRT-0087707E
SDCRT-0087932E	- SDCRT-0087933E
SDCRT-0087934E	- SDCRT-0087937E
SDCRT-0087938E	
SDCRT-0087953E	- SDCRT-0087962E
SDCRT-0088635	
SDCRT-0088661	
SDCRT-0088675	
SDCRT-0088713E	
SDCRT-0088715	
SDCRT-0088720	- SDCRT-0088725
SDCRT-0088732E	
SDCRT-0088738E	- SDCRT-0088739E

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Exhibit 2
List of Materials Relied Upon

SDCRT-0088740E	- SDCRT-0088742E
SDCRT-0088763	- SDCRT-0088772
SDCRT-0088773	
SDCRT-0088819E	- SDCRT-0088821E
SDCRT-0088846	- SDCRT-0088851
SDCRT-0089180	
SDCRT-0090174	
SDCRT-0090197E	
SDCRT-0090210E	- SDCRT-0090211E
SDCRT-0090233	
SDCRT-0090328	
SDCRT-0090339	- SDCRT-0090344
SDCRT-0091027	- SDCRT-0091852
SDCRT-0091351	
SDCRT-0091353E	
SDCRT-0091364E	
SDCRT-0091372E	
SDCRT-0091374E	
SDCRT-0091382E	
SDCRT-0091397E	
SDCRT-0091400E	
SDCRT-0091491	- SDCRT-0091504
SDCRT-0091599E	- SDCRT-0091604E
SDCRT-0091605	SDCRT-0091615
SDCRT-0091634	
SDCRT-0091643E	- SDCRT-0091647E
SDCRT-0091661	- SDCRT-0091667
SDCRT-0091687E	- SDCRT-0091691E
SDCRT-0201291	
SDCRT-0202981	
SEAI-CRT-00223186	

Toshiba

TAEC-CRT-00065484	
TAEC-CRT-00089342	
TAEC-CRT-00089968	- TAEC-CRT-00089969
TSB-CRT-00036875	
TSB-CRT-00045123	

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Exhibit 2
List of Materials Relied Upon

Other

FOX00150410

Data

Chunghwa

CHWA00000002
CHWA00000004
CHWA00000005
CHWA00000007
CHWA00000009
CHWA00000011
CHWA00000012
CHWA00000014
CHWA00256935
CHWA00256936

Hitachi

HAL-CRT00000051
HAL-CRT00001771
HDP-CRT00018516-T
HDP-CRT00018517 - HDP-CRT00018518
HEDUS-CRT00179555

LG Electronics

LGE00057028
LGE00057277
LGE00057335
LGE00057547
LGE00057554
LGE00057582

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Exhibit 2
List of Materials Relied Upon

LGE00057595
LGE00057608
LGE00057776
LGE--Highly Confidential 7
LGEUSA0001077 - LGEUSA0001082
ZENCRT44-HC - ZENCRT46-HC

LG Philips Display

LPD_00005516
LPD_00010955
LPD_00034712
LPD_00044227
Monthly billing files for 1999 - 2004

Mitsubishi

ME 00087280-410
ME 00087412-542
ME 00087809-908
ME 00087909-955
ME 0212-ME 0253

Panasonic Entities

MTPD-0122906
MTPD-0347731 - MTPD-0347738
MTPD-0652301 - MTPD-0652307
MTPD-0652322 - MTPD-0652339
PNA-0000001 - PNA-0017751
PNA-0027160 - PNA-0027168
PNA-0027176

Philips

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Exhibit 2
List of Materials Relied Upon

CUSTMST.xls	
PHLP-CRT-130382	- PHLP-CRT-130384
PHLP-CRT-130385	- PHLP-CRT-130388
PHLP-CRT-130389	- PHLP-CRT-130391
PRODCODE.xls	
YTDDEC93.xls	
YTDDEC94.xls	
YTDDEC95.xls	
YTDDEC96.xls	
YTDDEC97.xls	
YTDDEC98.xls	
YTDMAR.xls	

Samsung

SDCRT-0021274	- SDCRT-0021277
SDCRT-0083118	- SDCRT-0083119
SEAI-CRT-00165559	

Thomson

TCE-CRT 0004410
TCE-CRT 0004453
TCE-CRT 0004498
TCE-CRT 0004568

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Exhibit 2
List of Materials Relied Upon

Toshiba

TACP-CRT-00000046	-	TACP-CRT-00000064
TAEC-CRT-00016371		
TAEC-CRT-00016373		
TAIS-CRT-00000970		
TSB-CRT-00061306	-	TSB-CRT-00061317

Other

Korean Fair Trade Commission Multi-Party Meeting Decision Report, No. 2011-019, March 10, 2011.

Samsung SDI Defendants' Supplemental Responses to Direct Purchaser Plaintiffs' First Set of Interrogatories, NOS. 4 and 5, October 17, 2011.

Testimony of Pat Magrath of Georgetown Economic Services before the United States International Trade Commission, February 17, 2000.

Testimony of S.J. Yang before the Japan Fair Trade Commission, April 8-9, 2008.

DISP_LCD_000129

EXHIBIT E

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION**

**CONFIDENTIAL – TO BE FILED UNDER SEAL
SUBJECT TO PROTECTIVE ORDER**

**IN RE: CATHODE RAY TUBE (CRT)
ANTITRUST LITIGATION**

**Master File No. CV-07-5944-SC
MDL No. 1917**

THIS DOCUMENT RELATES TO:

**Crago, d/b/a Dash Computers, Inc., et al. v.
Mitsubishi Electric Corporation, et al., Case
No. 14-CV-2058 SC**

EXPERT REPORT OF JEFFREY J. LEITZINGER, PH.D.

September 1, 2016

**UNREDACTED VERSION OF DOCUMENT
SOUGHT TO BE SEALED**

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Subject to Protective Order

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I. Experience and Qualifications

1. My name is Jeffrey J. Leitzinger. I am an economist and a Managing Director at Econ One Research, Inc., an economic research and consulting firm with offices in Los Angeles, Sacramento, Berkeley, Lafayette, Houston, Washington D.C., and New Delhi, India. I have both master and doctoral degrees in economics from the University of California at Los Angeles and a bachelor's degree in economics from Santa Clara University. During the 36 years of my professional career, I have worked extensively on the analysis of markets and the assessment of allegations of anti-competitive conduct, including a number of antitrust conspiracy cases. I have testified on numerous occasions as an expert economist in State and Federal courts. A more detailed summary of my training, past experience, and prior testimony is shown in **Exhibit 1**.
2. I previously analyzed impact and damages in this case in several Reports.¹ In the course of preparing this report, my staff and I have reviewed discovery documents, depositions and publicly available materials listed in **Exhibit 2** in addition to those listed in those previous Reports. Econ One is being compensated for the time I spend on this matter at my normal and customary rate of \$775 per hour. Econ One is also being compensated for time spent by research staff on this project at their normal and customary hourly rates.

II. Assignment and Summary of Conclusions

3. Plaintiffs allege that the defendants in the case ("Defendants") and their co-conspirators² engaged in a price-fixing conspiracy for the purpose of fixing, raising, maintaining and/or stabilizing prices of cathode ray tubes ("CRTs") and that CRT

¹ Corrected Expert Report of Jeffrey J. Leitzinger, August 1, 2013 ("Leitzinger 2013 Class Report"); Reply Expert Report of Jeffrey J. Leitzinger, November 9, 2013 ("Leitzinger 2013 Reply Class Report"); Expert Report of Jeffrey J. Leitzinger, November 6, 2014 ("Leitzinger 2014 Class Report").

² Defendants are Mitsubishi Electric Corp.; Mitsubishi Digital Electronics America, Inc.; and Mitsubishi Electric & Electronics, USA, Inc. (together, "Mitsubishi"). Plaintiffs also allege that (1) Chunghwa Entities; (2) Orion Entities; (3) Hitachi Entities; (4) Irico Entities; (5) LG Electronics Entities; (6) LG Philips Display; (7) Panasonic Entities; (8) Philips Entities; (9) Samsung Entities; (10) Thai-CRT; (11) Thomson; (12) Toshiba Entities; (13) MT Picture Display Co., Ltd.; and (14) Beijing-Matsushita Color CRT Company, Ltd. were members of the alleged conspiracy. See Direct Purchaser Plaintiffs' Complaint Against Mitsubishi and Thomson, May 5, 2014 ("Complaint") and Appendix A, Leitzinger 2014 Class Report.

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products (CRTs and finished products incorporating CRTs) were sold at elevated prices in the United States between March 1, 1995 and November 25, 2007 (the “Class Period”). The conspiracy in this case is alleged to have begun in 1995 and continued operating (at least in some fashion) through the commencement of the Department of Justice investigation of the industry in November 2007. According to the Complaint, Defendants and co-conspirators:

- i. Established targets for minimum prices of various CRTs defined by size and application, as well as elevated market price levels for CRTs overall;
 - ii. Agreed to restrain output and capacity;
 - iii. Agreed to allocate markets and/or customers;
 - iv. Discussed and agreed upon prices as to specific customers; and
 - v. Exchanged information on pricing, shipments, capacity, output, and production line status for CRTs.
4. Plaintiffs are a class of direct purchasers of CRT products from the Defendants and co-conspirators. The class is defined as:

All persons and entities who, between March 1, 1995 and November 25, 2007, directly purchased a CRT Product³ in the United States from any defendant or any subsidiary or affiliate thereof, or any co-conspirator or any subsidiary or affiliate thereof. Excluded from the class are defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.⁴

5. I previously submitted three related reports in this matter addressing whether there is evidence common to Class Members sufficient to prove widespread impact of the

³ CRT products include CRTs, CRT TVs, and CRT monitors.

⁴ Order In Re Class Certification with Respect to the Thomson and Mitsubishi Defendants, July 8, 2015 at 6:9-6:16.

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alleged conspiracy and whether the total harm to those Class Members can be reasonably ascertained in a class-wide formulaic manner.⁵ Since that time, I have been asked by plaintiffs' counsel to quantify the overcharges incurred by the Class as a result of the alleged conspiracy and to opine on whether the economic evidence supports Plaintiffs' allegation that the conspiracy was successful in raising prices of Mitsubishi CRTs and CRT finished products above competitive levels. In the course of my work on this assignment, my staff and I have reviewed extensive data, documents, and testimony developed through the course of discovery in this case. A list of the materials we have reviewed is included as Exhibit 2.

6. Having now completed my work on this assignment, I have concluded that the overcharges incurred by the Class were \$876 million. In addition, economic evidence supports the conclusion that Mitsubishi's CRT prices and prices of CRT products containing Mitsubishi CRTs were similarly elevated. In particular:
 - Mitsubishi's CRTs and CRT products competed in the same markets as other conspirators' CRTs and CRT products.
 - Mitsubishi's CRT sales were largely concentrated in products that were specifically covered by conspirators' price targeting activities.
 - In regards to products sold by Mitsubishi for which there is evidence of price targets, Mitsubishi's prices aligned closely with those targets.
 - More generally, Mitsubishi's prices moved closely with those of the other alleged conspirators.
7. I provide a detailed discussion of these conclusions and their basis below. I understand that discovery has not yet been completed and that further evidence might emerge that is relevant to my analysis. I intend to consider additional evidence as it develops and may revise my conclusions or supplement their evidentiary basis as warranted by that evidence.

⁵ Leitzinger 2013 Class Report, Leitzinger 2013 Reply Class Report, and Leitzinger 2014 Class Report.

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III. Mitsubishi's Role in the CRT Industry

8. I previously described Mitsubishi's general role in the industry.⁶ As I noted, Mitsubishi manufactured both CDTs and CPTs during the class period. Mitsubishi's CRTs presented consumers with the same fundamental function and characteristics—i.e. the same ability to display an image in color—as CRTs from other conspirators. Mitsubishi utilized the same channels of distribution, sought out the same type of customers and sold its products as direct alternatives to those of other CRT manufacturers and CRT product manufacturers.⁷
9. As shown in Figure 1, about 63% of Mitsubishi CDT shipments were to customers who also purchased from other co-conspirators.⁸ The shared customers for CRTs included OEMs and ODMs such as Fujitsu, JVC, Acer, Iiyama, Amtran, and Tatung, as well as co-conspirators such as LG, Panasonic (Matsushita), and Philips. Similarly, Mitsubishi finished products were sold in the U.S. to many customers—for instance, Ingram, Fry's, HP, CDW, and Circuit City—that also purchased finished CRT products from other alleged conspirators. For all of these reasons, it is clear that Mitsubishi's CRT sales occurred within the same market environment as did the sales of the other alleged conspirators.

⁶ Leitzinger 2014 Class Report, 62.

⁷ Mitsubishi used an aperture grill technology licensed from Sony that was different from the shadow mask technology used by many other CRT manufacturers. Although some consumers may have perceived a difference in performance under some circumstances, this difference did not somehow place Mitsubishi's CRTs in a separate market from a pricing standpoint. Aperture grill and shadow mask could be easily substituted for one another in the CRT product. See e.g. testimony from Princeton Display Technology representative: "Q. Can a buyer of CRT easily interchange aperture grille tube for shadow mask tube? A. You see, if you have the CRT of the same size in both designs, you could in principle use [aperture grill or shadow mask], but there are gives and takes. In certain cases the aperture grille will be better, quote-unquote better, in some cases a shadow mask would be better, and so you use them according to your application." Deposition of Princeton Display Technologies, Inc., Suprasad Baidyaroy, Ph.D., June 7, 2016 at 20:11-20. Documents also reveal that Mitsubishi's aperture grill CRTs were priced relative to the base shadow mask CRT. See e.g., "Keep A/G at a premium again S/M," CHU00028534 - CHU00028543 at 538; discussion of 17" and 19" A/G prices relative to SMF as "Same prices as SMF" or "SMF + \$5", ME00065027E- ME00065028E at 5028E. In addition, both types of CRTs competed with each other for the same contracts. For example, NMV, using aperture grill CRTs, competed against Samsung's shadow mask CRTs for a contract from HP-Compaq (NMV lost), ME00065247E- ME00065249E at 247E-248E.

⁸ To the extent that customers in the Mitsubishi data could not be matched properly with customer records in the data produced by other conspirators because of variations in the way customer names were recorded, Figure 1 may understate the degree of customer sharing.

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Figure 1
Mitsubishi Customer Overlap with Other Conspirators

	Number of Mitsubishi Customers	Mitsubishi Shipments	Share of Mitsubishi Shipments
	(1)	(2)	(3)
CDT			
6 Other Conspirators	2	4,922	0.03 %
5 Other Conspirators	4	543,618	3.07
4 Other Conspirators	6	3,087,883	17.43
3 Other Conspirators	10	2,406,812	13.59
2 Other Conspirators	15	3,499,976	19.76
1 Other Conspirators	8	1,551,790	8.76
At Least One Other Conspirator	45	11,095,001	62.63 %
CPT			
8 Other Conspirators	1	645,342	26.69 %
5 Other Conspirators	2	164,394	6.80
4 Other Conspirators	1	1,696	0.07
3 Other Conspirators	2	59,178	2.45
2 Other Conspirators	5	189,914	7.85
1 Other Conspirators	3	229,510	9.49
At Least One Other Conspirator	14	1,290,034	53.35 %

Source: CRT Manufacturers' Sales Data.

10. In my previous reports, I presented a statistical model showing that transaction characteristics (CRT's size, screen shape, the presence of ITC, quantity, and brand) explained most of the variation across transactions in CRT prices.⁹ With respect to Mitsubishi's CRT prices in particular, those same transaction characteristics (and their effects on prices as previously estimated) account for 92% of the price variation for its CPTs and 79% of the price variation in its CDTs.
11. Taken together, Mitsubishi and the other alleged co-conspirators accounted for the vast majority of industry sales. As shown in Figure 2, the combined market share of

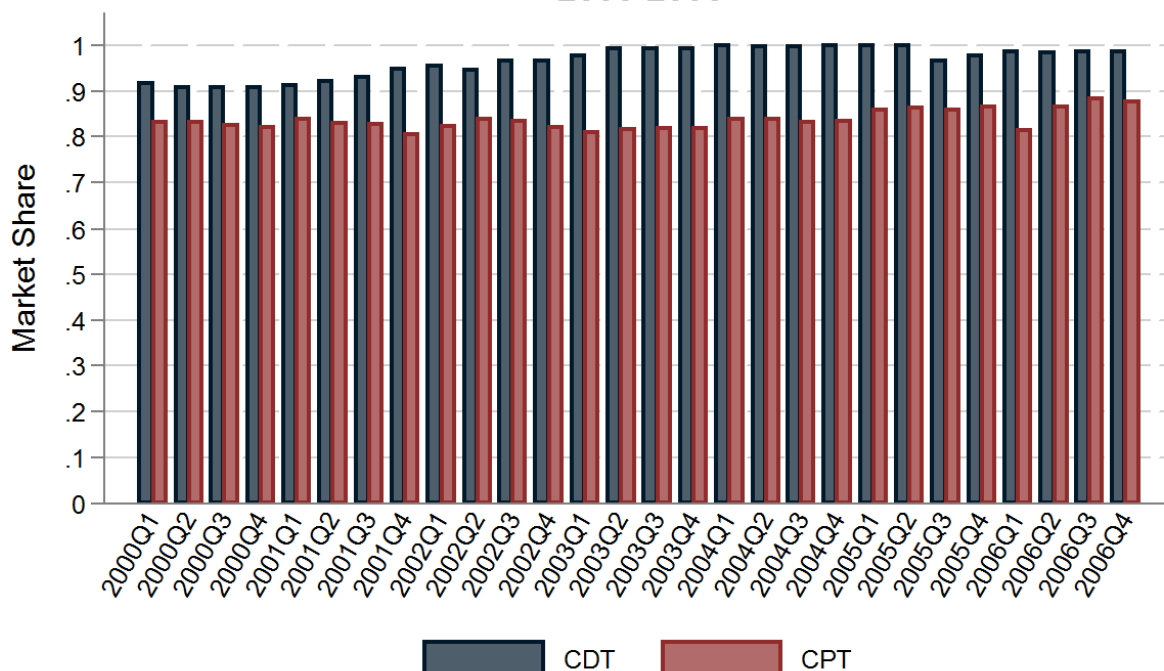
⁹ That analysis included Mitsubishi along with other conspirators. Leitzinger 2014 Class Report, 15.

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the co-conspirators from 2000-2006 was close to 90 percent. During this period, the co-conspirators held about 80 - 100 percent of the industry's capacity.¹⁰ As I noted in previous reports, this high degree of collective control over industry sales possessed by the co-conspirators is an important factor in the likely success of the conspiracy.¹¹

Figure 2

**Defendant and Co-Conspirator Share of Global CRT Production
2000-2006**



Source: MTPD-0416090; SDCRT-0201291; CHU00071226; CHU00154037-CHU00154420 at 154389-90; CHU00281352-CHU00281923 at 281644-45; CHWA00062147-CHWA00062569 at 62427; CHWA00088192-CHWA00088762 at 88484; CHWA00106460-CHWA00106757 at 106730.

12. Figure 3 and Figure 4 show the breakdown of yearly market shares of CDTs and CPTs by the conspirator manufacturers. The alleged conspiracy included three firms with high market shares (Chunghwa, Samsung, and LG). From a sales share perspective, Mitsubishi falls within a second group of alleged co-conspirators which

¹⁰ See PHLP-CRT-014823; MTPD-0575968; MTPD-0468631; LGE00081653; BMCC-CRT000057539; BMCC-CRT000006384. Defendants' and co-conspirators' market share of CDT sales between 1996 and 1999 averaged 89 percent.

¹¹ Leitzinger 2014 Class Report, 12-13.

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includes Orion, Thai-CRT, and Irico that had smaller market shares. Benefits from a successful conspiracy accrue to all participants, both large and small.

Figure 3: Conspirators' CDT Market Shares

Manufacturer	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
	(Percent)										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
MTSUBISHI	2.1 %	2.5 %	2.2 %	2.8 %	4.9 %	4.8 %	3.8 %	2.8 %	0.7 %		
CHUNGHWA	20.5	15.8	17.9	20.6	20.3	21.1	22.8	24.0	23.9	23.8	26.3
HITACHI	12.7	13.7	9.3	5.1	4.5	2.9					
IRICO	0.3	0.0		0.8	0.9						
LPD	16.8	18.6	21.6	24.7	23.4	24.3	27.9	31.2	34.3	32.1	29.1
MTPD	16.3	16.6	13.1	10.3	7.4	4.6	3.6	0.7			
ORION	4.5	5.4	5.9	5.5	6.4	6.8	4.5	4.0	2.1	1.7	
SAMSUNG	16.3	15.5	20.3	20.5	22.8	28.5	33.2	36.2	38.9	41.1	43.3
THAI-CRT					0.3						

Note: Matsushita (Panasonic) and Toshiba are combined with MTPD.

Source: SDCRT-0201291; CHU00071226; CHU00154037-CHU00154420 at 154389-90;
CHWA00088192-CHWA00088762 at 88484; CHWA00106460-CHWA00106757 at 106730.

Figure 4: Conspirators' CPT Market Shares

Manufacturer	2000	2001	2002	2003	2004	2005	2006
	(Percent)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CHUNGHWA	6.1 %	4.4 %	5.1 %	5.0 %	7.0 %	6.3 %	7.7 %
HITACHI	2.7	2.7	2.3	2.4	2.9	2.8	3.4
IRICO	4.2	4.7	5.3	5.9	6.3	7.1	7.5
LPD	23.8	23.5	24.0	23.0	21.0	22.9	21.7
MTPD	12.7	13.2	13.1	12.4	12.1	11.7	10.4
ORION	5.0	5.6	4.6	3.5	3.3	3.5	2.8
SAMSUNG	15.7	17.4	18.1	18.5	19.5	20.6	21.3
THAI-CRT	2.6	2.5	2.9	3.3	2.9	2.1	1.7
VIDEOCON	10.1	8.5	7.7	7.5	8.6	9.1	9.5

Source: MTPD-0416090

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IV. Impact on Mitsubishi Prices

13. As discussed in my prior reports, price targeting was apparently one of the principal means through which the conspirators coordinated their behavior to influence prices. During the class period, Mitsubishi's CRT production focused on CDTs, which accounted for close to 90 percent of shipments. As shown in Figure 5, about two-thirds of Mitsubishi CRT shipments were either 17 inch or 19 inch CDTs. There is evidence that has emerged in this case regarding price targeting for both of these products. Indeed, as Figure 5 also shows, I have seen documentary evidence of price targeting for CRT types and sizes representing almost three quarters of Mitsubishi's CRT sales during the alleged conspiracy period.

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Figure 5: Mitsubishi Global CRT Shipments during Conspiracy Period

Product Type	Size	Total Shipments	Total Revenues	Share of Total Shipments
		(Units)	(USD)	(Percent)
(1)	(2)	(3)	(4)	(5)
1. Targeted				
CDT	17	10,362,976	\$ 1,499,204,869	50.0 %
CDT	19	3,387,072	450,213,532	16.3
CPT	28	758,889	150,972,488	3.7
CDT	15	201,704	28,745,608	1.0
CPT	25	183,623	24,914,799	0.9
CPT	32	170,071	60,364,508	0.8
CPT	29	132,384	31,042,830	0.6
CDT	14	109,559	11,297,895	0.5
CPT	21	259	24,792	0.0
CPT	14	109	8,708	0.0
Total Targeted		15,306,646	\$ 2,256,790,028	73.9 %
2. Non-Targeted				
CDT	21	2,551,598	\$ 619,247,520	12.3 %
CDT	20	1,610,082	598,743,062	7.8
CPT	24	380,183	50,201,631	1.8
CPT	19	335,964	40,870,095	1.6
CPT	36	153,580	72,861,580	0.7
CPT	33	144,862	62,725,781	0.7
CPT	38	116,293	56,819,965	0.6
CPT	40	105,392	70,901,542	0.5
CDT	12	8,471	1,051,286	0.0
CDT	16	4,535	1,041,099	0.0
CDT	26	3,517	7,738,448	0.0
CPT	30	2,075	685,023	0.0
CPT	26	1,062	223,166	0.0
CDT	18	217	27,541	0.0
Total Non-Targeted		5,417,831	\$ 1,583,137,737	26.1 %

Note: Sales of CRT products unidentified as CDT or CPT not included.

"Targeted Products" are CRTs for which target prices were found.

Source: CRT Manufacturers' Sales Data; Conspiracy Documents.

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14. In my previous reports, I analyzed whether or not target prices affected actual prices using a statistical model to control for other supply and demand factors.¹² Here, I apply that same model to Mitsubishi's CDT prices (given its more limited CPT sales, there wasn't sufficient data to provide meaningful results). Figure 6 presents the results of this regression. As is the case for the other Conspirators generally, these results show that Mitsubishi's prices were affected by target prices. The results of this regression indicate that, on average, a one percent change in target price resulted in 0.62 percent change in the actual price in the contemporaneous period¹³ and 1.27 percent change in the actual price in the long run.¹⁴ These effects are highly significant as a statistical matter.

¹² Leitzinger 2014 Class Report, 30-31.

¹³ This is the coefficient on $D\text{Log}(\text{Target Price})$.

¹⁴ Computed as $\text{Log}(\text{Target Price}(-1))/(1-\text{Log}(\text{Mitsubishi Actual Price}(-1)))$.

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Figure 6: Mitsubishi Target Price Regression (CDTs)

Variable	Estimate	Cluster ⁹		
		Std. Error	T-Value	P-Value
(1)	(2)	(3)	(4)	(5)
<i>Dependent Variable:</i>				
<u>Log(Mitsubishi Actual Price)¹</u>				
Log Mitsubishi Actual Price (-1)	0.500 ***	0.119	4.192	0.001
Log Target Price (-1) ²	0.633 ***	0.151	4.184	0.001
DLog Target Price	0.617 ***	0.157	3.920	0.001
Log BLS Glass Price (-1) ³	2.386 ***	0.772	3.088	0.006
DLog BLS Glass Price	3.989 ***	0.789	5.054	0.000
Log BOK Glass Price (-1) ⁴	-0.361	0.478	-0.757	0.459
DLog BOK Glass Price	0.203	0.260	0.783	0.444
Log CRT Quantity (-1)	0.003	0.006	0.604	0.554
LCD/(LCD+CRT) Sales (-1) ⁵	4.850 ***	0.638	7.607	0.000
LCD/(LCD+CRT) Sales (-1) ²	2.823 ***	0.809	3.488	0.003
G7 Production Growth ⁶	-0.092 ***	0.016	-5.747	0.000
G7 Unemployment Rate ⁷	-0.361 ***	0.087	-4.158	0.001
Trend	-0.120 ***	0.012	-10.345	0.000
Trend-square	-0.005 ***	0.001	-10.164	0.000
Constant	-11.434 **	4.059	-2.817	0.011
Fixed Effects ⁸	YES			
R-Square	0.903			
Observations	203			

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

¹ Quarterly average transaction price weighted by quantity for each Mitsubishi customer by CDT size.

² Weighed average target prices for CDTs by size.

³ Producer price index for machine-made pressed and blown lighting, automotive, and electronic glassware from BLS.

⁴ Producer price index of CRT glass from Bank of Korea

⁵ Total LCD/(LCD+CRT) shipment ratio by application. Series starts in 1999. Extrapolated to pre-1999 period.

⁶ Quarterly growth rate of industrial production for G7 member countries.

⁷ Quarterly unemployment rate for G7 member countries.

⁸ Fixed effects by customer-product type-size are included.

⁹ Clustered Robust Standard Errors by Quarter.

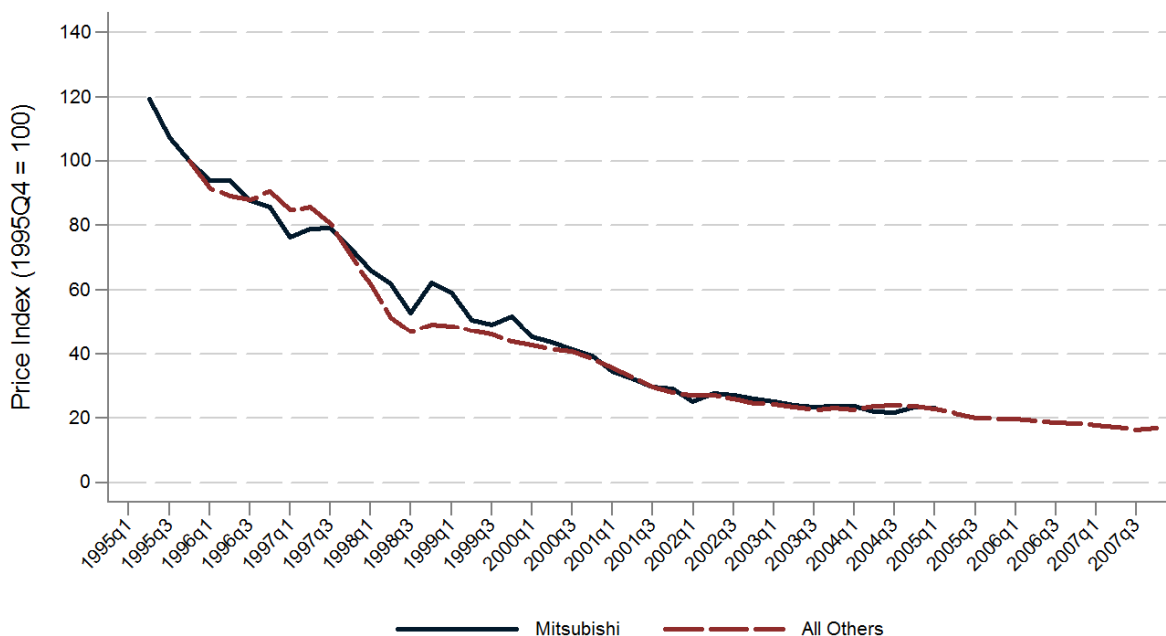
Source: CRT Manufacturers' Sales Data; DisplaySearch Data; Bank of Korea; US BLS; OECD; Conspiracy Documents.

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15. In Figure 7, I compare Mitsubishi's CDT prices with those charged by other manufacturers allegedly involved in the conspiracy. As it shows, Mitsubishi prices closely followed the prices of all other conspirator manufacturers.

Figure 7

**Prices of Mitsubishi CRTs vs. Other Manufacturers
Quarterly Fisher Matched-Model Price Index
CDTs**



Note: Includes sizes 17, 19, 20, 21.

Source: CRT Manufacturers' Sales Data.

V. Impact on CRT Finished Products Purchased from Conspirators

16. I performed a regression analysis in my previous report to examine the statistical relationship between CRT prices and CRT product prices. Figure 8 updates the analysis I presented in my earlier report to include data I received for NMV (a joint venture of NEC and Mitsubishi).¹⁵

¹⁵ NMV is a display monitor joint venture between NEC and Mitsubishi established in January 2000. NMV began operations in April 2000 and expanded its activities to both the U.S. and Europe by July 2000. In February 2005, NMV became a wholly-owned subsidiary of NEC. (See "Display Monitor Joint Venture between NEC and Mitsubishi Launch of NEC-Mitsubishi Electronics Display – Europe GmbH," NEC,

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17. The relationship between CRT prices and CRT finished product prices is reflected in the coefficient associated with the CRT price variables. The coefficients indicate that increases in CRT prices resulted in increases in finished product prices both for CDTs and CPTs. For CDTs, a one percent price increase was associated, on average, with a 0.71 percent increase in the finished product price. For CPTs, a one percent increase in price was associated, on average, with a 0.78 percent increase in the finished product price. For example, if a \$100 CDT increased in price to \$101 (i.e. 1 percent), a \$150 Monitor containing that tube would be expected to increase in price by \$1.07 (i.e. 0.71 percent of the \$150 finished product price). If a \$100 CPT increased in price to \$101, a \$200 TV containing that tube would be expected to increase in price by \$1.56 (i.e. 0.78 percent of the \$200).

<https://www.nec-display-solutions.com/p/uk/en/news/dp/Products/Shared/News/2000/PressReleases/Company/Venture/Venture.xhtml?year=2000> and “NEC-Mitsubishi Electric Visual Systems Corporation to become NEC Corporation wholly-owned subsidiary,” NEC, <https://www.nec-display-solutions.com/p/uk/en/news/dp/Products/Shared/News/2005/PressReleases/Company/NMElectronicVisualCorporation/NMElectronicVisualCorporation.xhtml?year=2005>.

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Figure 8: CRT Finished Product Regression

Variable	Coefficient	Clustered Std. Error ⁸	T-value	P-value
	(1)	(2)	(3)	(4)
<i>Dependent Variable</i>				
Log(CRT Finished Product Price) ¹				
Log CDT Tube Price (-1) * Monitor Indicator ²	0.705 ***	0.034	20.789	0.000
Log CPT Tube Price (-1) * TV Indicator ²	0.775 ***	0.016	47.296	0.000
LCD/(LCD+CRT) Sales (-1) * Monitor Indicator ³	-0.685 *	0.414	-1.656	0.098
LCD/(LCD+CRT) Sales (-1) * TV Indicator	2.186 ***	0.838	2.608	0.009
LCD/(LCD+CRT) Sales (-1) ^ 2 * Monitor Indicator	1.858 ***	0.663	2.800	0.005
LCD/(LCD+CRT) Sales (-1) ^ 2 * TV Indicator	-1.702 **	0.663	-2.566	0.010
DLog Desktop Shipments x Monitor Indicator ⁴	0.048	0.217	0.223	0.824
Log TV Tuner PPI x TV Indicator ⁵	-0.026	0.034	-0.784	0.433
G7 Industrial Growth ⁶	0.002	0.015	0.124	0.901
G7 Unemployment Rate ⁷	0.033	0.052	0.635	0.525
Trend	-0.011 **	0.005	-2.395	0.017
Trend ^ 2	-0.001 **	0.000	-2.406	0.016
Constant	1.944 ***	0.267	7.288	0.000
Observations	886			
R-squared	0.767			

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

¹ Quarterly average transaction price weighted by quantity for each application and size.

² Quarterly average transaction price of ITC tubes weighted by quantity for each application and size; matched with finished product prices based on application and same size for monitors; one size up for TVs less than 27 inch and two sizes up for larger TVs.

³ Total LCD/(LCD + CRT) sales ratio by application. Extrapolated in years with missing data.

⁴ Growth in Desktop PC World Wide Shipments interacted with an indicator for CDT.

⁵ Quarterly Production Price Index for TV Tuners interacted with an indicator for CPT.

⁶ Quarterly Growth Rate of Industrial Production for G7 member countries.

⁷ Quarterly Unemployment Rate for G7 member countries.

⁸ Standard Errors adjusted for clustering at the application-size and quarter level.

Source: CRT Manufacturers' Sales Data; CRT Finished Product Manufacturers' Sales Data; DisplaySearch; Bank of Korea; U.S. BLS; OECD

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VI. Overcharges Incurred by the Class

A. Overcharges on CRTs

18. In my previous report, I used a regression model to calculate percentage overcharges (relative to sales) on CDTs and CPTs.¹⁶ Here, I apply those overcharge percentages to my estimates of total Class purchases. For that purpose, I used the Conspirators' sales data to calculate the value of sales to Class Members who purchased CRTs directly from them during the class period. In that regard, I excluded sales between Conspirators and sales to opt-outs. Counsel has informed me that class sales are those that were either billed to or shipped to the U.S. Therefore, I also excluded sales identified within the data as involving both non-U.S. bill-to and ship-to locations. The remaining transaction entries specifically reflect U.S. bill-to or ship-to locations or lack location information. Figure 9 shows the breakdown of the sales data under these two categories.

¹⁶ See Leitzinger 2014 Class Report, 47.

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Figure 9: CRT Sales to Class Entities by Destination

Year	All Sales ¹		U.S. Destinations ²		Unknown Destinations ³		% Unknown among All Sales	
	CDT	CPT	CDT	CPT	CDT	CPT	CDT	CPT
	(Million Dollars)						(Percent)	
							(6)/(2)*100	(7)/(3)*100
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1995	\$ 1,821	\$ 836	\$ 78	\$ 109	\$ 1,743	\$ 723	95.7 %	86.5 %
1996	2,895	1,084	175	118	2,719	960	93.9	88.6
1997	2,564	1,021	62	128	2,502	868	97.6	85.0
1998	3,210	1,440	10	165	3,199	1,244	99.7	86.4
1999	3,133	1,911	12	201	3,120	1,679	99.6	87.9
2000	3,311	1,724	6	289	3,305	1,426	99.8	82.7
2001	2,239	1,434	5	252	2,234	1,178	99.8	82.2
2002	1,809	2,684	4	210	1,804	2,472	99.8	92.1
2003	1,066	2,055	1	126	1,064	1,929	99.9	93.9
2004	1,318	2,359	0	97	1,317	2,262	100.0	95.9
2005	847	1,812	0	42	847	1,770	100.0	97.7
2006	635	1,803	0	25	635	1,778	100.0	98.6
2007	246	1,173	1	12	246	1,161	99.7	98.9
Total	\$25,093	\$ 21,335	\$ 354	\$ 1,774	\$ 24,736	\$ 19,449	98.6 %	91.2 %

¹ All sales excluding sales to opt-outs, defendants and co-conspirators, regardless of location.

² Sales with U.S. specified for bill-to or ship-to countries.

³ Sales with unknown bill-to or ship-to countries

Source: CRT Manufacturers' Sales Data.

19. Further, I understand that the Conspirators did not produce their entire sales records for the duration of the class period. I summarize the types of relevant sales data that appear to be completely missing in Figure 10.¹⁷ The dollars associated with the apparently missing data are substantial. According to my estimates using industry

¹⁷ This figure summarizes time periods and product types for which sales data are missing entirely. In addition, the sales data for other periods and products that we do have may be incomplete. For example, Mitsubishi's transactional data contains around 11.9 million units of CDTs shipped between 1996 and 2000. However, industry data sources indicate that Mitsubishi shipped around 14.2 million units of CDTs during the same period (SDCRT-0201291).

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data sources other than the Conspirators' transaction sales data, these missing sales account for around \$106 million for CDT and \$1.13 billion for CPT.

Figure 10: Missing CRT Sales Data

Defendant/ Co-Conspirator	Product Type	Period	Entities	Supporting Documents
(1)	(2)	(3)	(4)	(5)
Hitachi	CDT	All	Singapore & Malaysia Subsidiaries	MTPD-0416090.xls
Irico	CDT & CPT	All	All	MTPD-0416090.xls; SDCRT-0201291.xls (see Caihong)
Thomson	CPT	1995-1999 & 2005	All but TDA ¹	IBEW Journal Article
Samsung	CDT & CPT	1995-1997	All	March 8, 2012 letter from Samsung counsel; SDCRT-0201291.xls
Orion	CDT & CPT	All	All	MTPD-0416090.xls; SDCRT-0201291.xls (see OEC)
Thai-CRT	CDT & CPT	All	All	MTPD-0416090.xls; SDCRT-0201291.xls

Note: ¹ Technologies Displays Americas (formerly Thomson Displays Americas)

Source: CRT Manufacturers' Sales Data;
MTPD-0416090.xls;
SDCRT-0201291.xls;
March 8, 2012 letter from Samsung counsel;
IBEW Journal Article (<http://www.ibew.org/articles/04journal/0405/p11.htm>)

20. To incorporate the class sales amounts associated with this missing data, I made two adjustments to the class sales figures. First, to remedy the unknown sales locations, I computed the annual CDT and CPT U.S. shares of the global sales using industry data. These shares are presented in Figure 11 below. I then applied these annual percentages to the annual missing destination sales amounts. Second, to estimate the class sales for which sales data was not produced, I used non-transactional industry global CRT sales data for each manufacturer for the periods with missing records (listed in Figure 10).¹⁸ I then adjusted these global sales for the U.S. share (using the annual shares of the transactional sales data that were billed to the U.S.) and for sales to non-class entities (i.e. eliminating sales to co-conspirators and opt-outs), using the share of sales to those entities in the transactional data.¹⁹

¹⁸ Because only unit shipments are available in the industry data, I use weighted average prices by CRT type, size, and year obtained from the transactional data to the units sold in the industry data to derive the total dollar sales.

¹⁹ Details of this process are provided in the work materials.

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Figure 11

Year	N. America Share of Global Sales ¹		U.S. Share of	U.S. Share of Global Sales	
	CDT	CPT	N. America ²	CDT	CPT
	(Percent)				
(1)	(2)	(3)	(4)	(2)*(4)	(3)*(4)
1995	1.8 % ³	11.2 % ⁴	85.2 %	1.5 %	9.5 %
1996	1.8 ³	11.2 ⁴	85.3	1.5	9.6
1997	1.8 ³	11.2 ⁴	84.9	1.5	9.5
1998	1.8 ³	11.2 ⁴	84.8	1.5	9.5
1999 ⁵	1.8 ³	11.2 ⁴	85.1	1.5	9.5
2000	1.9	10.9	85.1	1.6	9.3
2001	1.8	11.4	85.1	1.5	9.7
2002	1.7	11.2	85.0	1.4	9.5
2003	0.0	10.5	85.0	0.0	8.9
2004	0.0	12.0	85.1	0.0	10.2
2005	0.0	11.2 ⁴	84.9	0.0	9.5
2006	0.0 ⁶	11.2 ⁴	84.6	0.0	9.5
2007	0.0 ⁶	11.2 ⁴	84.3	0.0	9.4

Note: ¹ North America assumed to include Mexico. Shares are based on values in Yen.

² Calculated using domestic demand by country for U.S., Canada and Mexico obtained from OECD, as U.S./ (U.S.+Canada+Mexico).

³ The average of 2000-2002 is used as an estimate.

⁴ The average of 2000-2004 is used as an estimate.

⁵ Sales distribution by region were identical for CDT and CPT in 1999 and were deemed unreliable. The values were therefore not used.

⁶ Share assumed to have remained at zero.

Source: Cols. (2)-(3): Fuji Chimera Institute, Flat Panel Display Applications: Trends and Forecasts, Editions 2000-2007.

Col. (4): OECD Annual Domestic Demand by Country
(http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1)

21. To compute Class damages for CRT purchases, I applied the annual average overcharge for each type of CRT (CDT or CPT) to the Conspirators' class sales for CRTs of each type (respectively).²⁰ As shown in Figure 12, I estimate that overcharges incurred by CRT purchasers were \$331 million.

²⁰ The overcharge percentages are derived from the "CRT Overcharge Regression" model presented in

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Figure 12: Summary of CRT Overcharges

Year	Class Sales						Damages							
	Additional Estimated													
	Conspirators Data ¹		Missing Data ²		Overcharge Percent		Conspirators Data ¹			Additional Estimated Missing Data ²			Total	
	CDT	CPT	CDT	CPT	CDT	CPT	CDT	CPT	Total	CDT	CPT	Total		
	(Million Dollars)				(Percent)		(Million Dollars)							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(Note 3) (8)	(Note 3) (9)	(8)+(9) (10)	(Note 3) (11)	(Note 3) (12)	(11)+(12) (13)		(10)+(13) (14)
1995	\$ 78	\$ 109	\$ 48	\$ 207	9.4 %	5.2 %	\$ 7	\$ 5	\$ 12	\$ 4	\$ 10	\$ 14	\$ 26	
1996	175	118	69	289	10.5	5.8	17	6	23	7	16	22	46	
1997	62	128	66	269	10.5	5.8	6	7	13	6	15	21	34	
1998	10	165	56	232	10.5	5.8	1	9	10	5	13	18	28	
1999	12	201	56	278	10.5	5.8	1	11	12	5	15	21	33	
2000	6	289	64	163	10.5	5.8	1	16	16	6	9	15	32	
2001	5	252	37	145	10.5	5.8	0	14	14	4	8	12	26	
2002	4	210	28	275	10.5	5.8	0	12	12	3	15	18	30	
2003	1	126	-	208	10.5	5.8	0	7	7	-	11	11	19	
2004	0	97	-	285	10.5	5.8	0	5	5	-	16	16	21	
2005	0	42	-	208	10.5	5.8	0	2	2	-	11	11	14	
2006	0	25	-	271	8.2	6.9	0	2	2	-	18	18	19	
2007	1	12	-	151	1.4	2.7	0	0	0	-	4	4	4	
Total	\$ 354	\$ 1,774	\$ 423	\$ 2,979			\$ 33	\$ 97	\$ 130	\$ 40	\$ 161	\$ 201	\$ 331	

¹ Identified U.S. sales to class members from CRT Manufacturers' Sales Data

² Estimated sales to class members either missing in CRT Manufacturers' Sales Data or identified as sales to Unknown locations.

³ Calculated as [Class Sales]*[Overcharge Pct] / (1+[Overcharge Pct])

Sources: Cols. (2)-(3): CRT Manufacturers' Sales Data

Cols. (4)-(5): CRT Manufacturers' Sales Data; TDA's Revised Answers to Indirect-Purchaser Plaintiff's First Set of Interrogatories to Defendants; MTPD-0416090; SDCRT-0201291; CHU00071226; CHU00154037-CHU00154420 at 154389-90; CHU00281352-CHU00281923 at 281644-45; CHWA00062147-CHWA00062569 at 62427;

CHWA00088192-CHWA00088762 at 88484; CHWA00106460-CHWA00106757 at 106730; PHLP-CRT-001370; FOX00007278; HDP-CRT00019322

Cols. (6)-(7): Per Overcharge Model in Leitzinger Class Cert Report, November 6, 2014

B. CRT Finished Product Overcharges

22. I used the Conspirators' transactional finished product sales data to calculate damages for direct CRT finished product purchasers. Here again, the Conspirators' transactional data are missing information on bill-to or ship-to country for a large share of transactions. Figure 13 shows the summary of class sales and the share of "Unknown" locations in the transactional datasets.

Leitzinger 2014 Class Report, 47.

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Figure 13: CRT FP Sales to Class Entities by Destination

Year	All Sales ¹		U.S. Destinations ²		Unknown Destinations ³		% Unknown among All Sales	
	Monitor	TV	Monitor	TV	Monitor	TV	Monitor	TV
	(Thousand Units)						(Percent)	
							(6)/(2)*100	(7)/(3)*100
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1995	111	2,791	41	1,487	70	1,305	62.9 %	46.7 %
1996	636	4,244	367	1,983	268	2,261	42.2	53.3
1997	665	3,989	529	2,158	136	1,831	20.5	45.9
1998	2,053	5,406	1,995	2,277	58	3,129	2.8	57.9
1999	1,601	7,423	1,563	3,535	38	3,888	2.3	52.4
2000	1,862	7,284	1,318	4,068	545	3,212	29.3	44.1
2001	1,636	6,147	724	4,563	912	1,581	55.8	25.7
2002	1,255	5,519	638	4,030	616	1,486	49.1	26.9
2003	767	4,004	467	3,393	300	611	39.1	15.3
2004	1,344	2,845	1,092	2,525	252	321	18.7	11.3
2005	467	2,654	372	2,384	95	269	20.4	10.1
2006	166	990	116	945	50	45	30.2	4.5
2007	28	217	11	217	16	0	59.1	0.2
Total	12,589	53,512	9,232	33,563	3,357	19,939	26.7 %	37.3 %

¹ All sales excluding sales to opt-outs, defendants and co-conspirators, regardless of location.

² Sales with U.S. specified for bill-to, ship-to, or sold-to countries.

³ Sales with unknown bill-to, ship-to, or sold-to countries.

Source: CRT Finished Product Manufacturers' Sales Data.

23. In addition, as with the CRT sales, Defendants did not produce their entire sales records for the relevant products. Figure 14 shows a summary of the missing sales data. Using industry data, I estimate that missing class sales are approximately \$3.23 billion for CRT monitors and \$3.55 billion for CRT TVs. Using the same methods as described above for CRTs, I have estimated Class purchases of CRT finished products that are included both within the CRT product sales data that lacked an identified sales location and in the CRT product sales that were missing entirely from the data production.²¹

²¹ Because only yearly unit shipments of all monitors and TVs are available in the industry data, I use weighted average prices by CRT type and year in the transactional sales data to calculate the annual dollar sales.

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Figure 14: Missing CRT Finished Product Sales Data

Defendant/ Co-Conspirator	Product Type	Period	Entities	Supporting Documents
(1)	(2)	(3)	(4)	(5)
Hitachi	Monitor	All	All	Hitachi News Release
Samsung	Monitor and TV	1995-1997	All	March 8, 2012 letter from Samsung counsel
Mitsubishi	Monitor	1995-1998	Mitsubishi	ME00096242
Orion	TV	All	All	DISP_LCD_000129.xlsx
Thomson	TV	All	All but TDA ¹	DISP_LCD_000129.xlsx (see TCL)

Note: ¹ Technologies Displays Americas (formerly Thomson Displays Americas)

Source: CRT Finished Product Manufacturers' Sales Data;
March 8, 2012 letter from Samsung counsel;
DISP_LCD_000129.xlsx;
Hitachi website (<http://www.hitachi.com/New/cnews/E/2001/0726b/0726.pdf>);
ME00096242

24. To compute damages incurred by the direct purchasers of CRT finished products, I first computed the average annual dollar overcharge associated with the corresponding CRT (by type), by applying the overcharge percentages derived above to the CRT price. I then multiplied this average per-unit dollar amount of overcharge by the corresponding units of CRT finished product sales to the class members. Adding those totals across products over time, I obtained total overcharges for CRT products sold by the Defendants. As shown in Figure 15, these calculations yield total Class overcharges for finished product purchases of \$545 million.

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Figure 15: Summary of CRT Finished Product Overcharges

Year	Class Sales							Damages						
	Additional Estimated				Average Per-Unit			Conspirators Data ¹			Additional Estimated Missing Data ²			
	Conspirators Data ¹		Missing Data ²		CRT Overcharge ³			Conspirators Data ¹			Conspirators Data ¹		Additional Estimated Missing Data ²	
	Monitor	TV	Monitor	TV	CDT	CPT		Monitor	TV	Total	Monitor	TV	Total	Total
	(Thousand Units)				(Dollars)			(Million Dollars)						
	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)	(11)	(12)	(13)	(14)
1995	41	1,487	2,871	3,390	\$ 8	\$ 4		\$ 0	\$ 6	\$ 6	\$ 24	\$ 14	\$ 37	\$ 44
1996	367	1,983	4,266	4,400	12	6		4	12	17	50	27	77	94
1997	529	2,158	4,315	3,900	11	7		6	15	21	49	27	76	96
1998	1,995	2,277	1,588	4,360	9	5		17	11	28	14	21	35	63
1999	1,563	3,535	148	4,966	9	5		13	17	31	1	24	26	56
2000	1,318	4,068	681	3,970	8	5		11	21	32	6	20	26	58
2001	724	4,563	1,039	2,207	7	5		5	23	28	7	11	18	45
2002	638	4,030	616	2,075	5	4		3	17	20	3	9	12	32
2003	467	3,393	300	1,307	5	4		2	13	15	1	5	6	21
2004	1,092	2,525	252	1,154	4	3		5	8	13	1	4	5	18
2005	372	2,384	95	1,573	4	3		1	7	8	0	4	5	13
2006	116	945	50	244	3	3		0	3	3	0	1	1	4
2007	11	217	16	151	0	1		0	0	0	0	0	0	0
Total	9,232	33,563	16,236	33,697				\$ 69	\$ 152	\$ 221	\$ 156	\$ 167	\$ 323	\$ 545

¹ Identified U.S. sales to class members from CRT Finished Product Manufacturers' Sales Data

² Estimated sales to class members either missing in CRT Finished Product Manufacturers' Sales Data or identified as sales to Unknown locations.

³ Average per-unit CRT overcharge weighted by quantity of CRT sold.

Sources: Cols. (2)-(3): CRT Finished Product Manufacturers' Sales Data

Cols. (4)-(5): CRT Finished Product Manufacturers' Sales Data; Mitsubishi (MEVSA)'s Third Supplemental Response to DPP Crago's First set of Interrogatories (and Bates-numbered documents referenced within); Oregon Department of Environmental Quality, Product Profile: CRTs, March 2001; Fuji Chimera Institute, Flat Panel Display Applications: Trends and Forecasts, Editions 2000-2007; DISP_LCD_000129; ME00096242

Cols. (6)-(7): Per Overcharge Model in Leitzinger Class Cert Report, November 2014

25. Combining CRT purchases and CRT finished product purchases, the total overcharges to the class of direct purchases are approximately \$876 million.²²

²² Sum of total CRT damages (\$331 million) and total CRT finished product damages (\$545 million). In the backup materials to this report, I calculate class sales and damages for each conspirator.

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I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. This declaration was executed on the first day of September at Los Angeles, California.



Jeffrey J. Leitzinger
September 1, 2016

Exhibit 1



Dr. JEFFREY J. LEITZINGER
Managing Director
Los Angeles, California
Tel: 213 624 9600

EDUCATION

Ph.D., Economics, University of California, Los Angeles
M.A., Economics, University of California, Los Angeles
B.S., Economics, Santa Clara University

WORK EXPERIENCE

Econ One Research, Inc., President, July 1997 to date
Founded *Econ One Research, Inc.*, 1997

Micronomics, Inc., President and CEO, 1994-1997
Micronomics, Inc., Executive Vice President, 1988-1994
Cofounded *Micronomics, Inc.*, 1988

National Economic Research Associates, Inc. 1980-1988
(Last position was Senior Vice President and member of the Board of Directors)

California State University, Northridge, Lecturer, 1979-1980

AREAS OF EXPERTISE

Has offered expert testimony regarding:

- Competition economics
- Commercial damages
- Econometrics and statistics
- Intellectual property
- Valuation

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Managing Director

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INVITED PRESENTATIONS

Where are we on Class Certification? Examples from Health Care and Pharmaceutical Cases, *ABA Section of Antitrust Law, Health Care and Pharmaceuticals and Civil Practice and Procedure and Trial Practice Committees*, March 2016.

Corporations & Cartels: Should You Be A Plaintiff?, *American Bar Association*, 62nd Antitrust Law Spring Meeting, March 2014.

Developments in Antitrust Cases Alleging Delayed Generic Competition in the Pharmaceutical Industry, *American Antitrust Institute*, 5th Annual Future of Private Antitrust Enforcement Conference, December 2011.

Class Certification and Calculation of Damages, *American Bar Association*, Section of Antitrust Law and *International Bar Association*, 8th International Cartel Workshop, February 2010.

Class Certification Discussion and Demonstration, *American Bar Association*, Section of Antitrust Law, The Antitrust Litigation Course, October 2007.

Antitrust Injury and the Predominance Requirement in Antitrust Class Actions, *American Bar Association*, Houston Chapter, April 2007.

Class Certification Discussion and Demonstration, *American Bar Association*, Section of Antitrust Law, The Antitrust Litigation Course, October 2005.

What Can an Economist Say About The Presence of Conspiracy?, *American Bar Association*, Antitrust Law, The Antitrust Litigation Course, October 2003.

Lessons From Gas Deregulation, *International Association for Energy Economics*, Houston Chapter, December 2002.

A Retrospective Look at Wholesale Gas Industry Restructuring, *Center for Research in Regulated Industries*, 20th Annual Conference of the Advanced Workshop in Regulation and Competition, May 2001.

The Economic Analysis of Intellectual Property Damages, *American Conference Institute*, 6th National Advanced Forum, January 2001.

Law and Economics of Predatory Pricing Under Federal and State Law, *Golden State Antitrust and Unfair Competition Law Institute*, 8th Annual Meeting, October 2000.

Non-Price Predation--Some New Thinking About Exclusionary Behavior, *Houston Bar Association*, Antitrust and Trade Regulation Section, October 2000.

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INVITED PRESENTATIONS (cont'd.)

After the Guilty Plea: Does the Defendant Pay the Price in the Civil Damage Action, American Bar Association, Section of Antitrust Law, 48th Annual Spring Meeting, April 2000.

Economics of Restructuring in Gas Distribution, Center for Research in Regulated Industries, 12th Annual Western Conference, July 1999.

A Basic Speed Law for the Information Superhighway, California State Bar Association, December 1998.

Innovation in Regulation, Center for Research in Regulated Industries, 11th Annual Western Conference, July/September 1998.

Electric Industry Deregulation: What Does The Future Hold?, Los Angeles Headquarters Association, November 1996.

Why Deregulate Electric Utilities?, National Association of Regulatory Utility Commissioners, November 1995.

Restructuring U.S. Power Markets: What Can the Gas Industry's Experience Tell Us?, National Association of Regulatory Utility Commissioners, July 1995.

Natural Gas Restructuring: Lessons for Electric Utilities and Regulators, International Association for Energy Economics, May 1995.

Techniques in the Direct and Cross-Examination of Economic, Financial, and Damage Experts, The Antitrust and Trade Regulation Law Section of the State Bar of California and The Los Angeles County Bar Association, 2nd Annual Golden State Antitrust and Trade Regulation Institute, October 1994.

Demonstration: Deposition of Expert Witnesses and Using Legal Technology, National Association of Attorneys General, 1994 Antitrust Training Seminar, September 1994.

Direct and Cross Examination of Financial, Economic, and Damage Experts, The State Bar of California, Antitrust and Trade Regulation Law Section, May 1994.

Price Premiums in Gas Purchase Contracts, International Association for Energy Economics, October 1992.

Valuing Water Supply Reliability, Western Economic Association, Natural Resources Section, July 1992.

Transportation Services After Order 636: "Back to the Future" for Natural Gas, Seminar sponsored by Jones, Day, Reavis & Pogue, May 1992.

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Managing Director

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INVITED PRESENTATIONS (cont'd.)

The Cost of An Unreliable Water Supply for Southern California, Forum presented by Micronomics, Inc., May 1991.

Market Definition: It's Time for Some "New Learning", *Los Angeles County Bar Association*, Antitrust and Corporate Law Section, December 1989.

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Future Directions for Antitrust Activity in the Natural Gas Industry, *International Association of Energy Economists*, February 1987.

Information Externalities in Oil and Gas Leasing, *Western Economic Association Meetings*, Natural Resources Section, July 1983.

Economic Analysis of Offshore Oil and Gas Leasing, *Western States Land Commissioners Association*, December 1982.

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"The Predominance Requirement for Antitrust Class Actions--Can Relevant Market Analysis Help?," American Bar Association, Section of Antitrust Law, *Economics Committee Newsletter*, Volume 7, No. 1, Spring 2007.

"Gas Line Economic?," *Petroleum News*, Volume 11, No. 25, June 2006.

"A Retrospective Look at Wholesale Gas: Industry Restructuring," *Journal of Regulatory Economics*, January 2002.

"Balance Needed in Operating Agreements as Industry's Center of Gravity Shifts to State Oil Firms," *Oil & Gas Journal*, October 2000.

"What Can We Expect From Restructuring In Natural Gas Distribution?" *Energy Law Journal*, January 2000.

"Gas Experience Can Steer Power Away from Deregulation Snags," *Oil & Gas Journal*, August 1996.

"Anatomy of FERC Order 636: What's out, What's in," *Oil & Gas Journal*, June 1992.

"Antitrust II – Future Direction for Antitrust in the Natural Gas Industry," *Natural Gas*, November 1987.

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Managing Director

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PUBLISHED ARTICLES (cont'd.)

"Information Externalities in Oil and Gas Leasing," *Contemporary Policy Issues*, March 1984.

"Regression Analysis in Antitrust Cases: Opening the Black Box," *Philadelphia Lawyer*, July 1983.

"Foreign Competition in Antitrust Law," *The Journal of Law & Economics*, April 1983.

REGULATORY SUBMISSIONS

In the Matter of the Application of Southern California Gas Company Regarding Year Six (1999-2000) Under its Experimental Gas Cost Incentive Mechanism and Related Gas Supply Matters; A.00-06-023, Public Utilities Commission of the State of California, November 2001.

Sempra Energy and KN Energy, Incorporation; Docket No. EC99-48-000 (Affidavit and Verified Statement), Federal Energy Regulatory Commission, March/May 1999.

Rulemaking on the Commission's Own Motion to Assess and Revise the Regulatory Structure Governing California's Natural Gas Industry (Market Conditions Report), Public Utilities Commission of the State of California, July 1998.

In the Matter of the Application of Pacific Enterprises, Enova Corporation, et al. for Approval of a Plan of Merger Application No. A. 96-10-038, Public Utilities Commission of the State of California, August/October 1997.

In re: Koch Gateway Pipeline Company; Docket No. RP 97-373-000, Federal Energy Regulatory Commission, May/October 1997 and February 1998.

In the Matter of the Application of Sadlerochit Pipeline Company for a Certificate of Public Convenience and Necessity; Docket No. P-96-4, Alaska Public Utilities Commission, May 1996.

Public Funding of Electric Industry Research, Development, and Demonstration (RD&D) Under Partial Deregulation, California Energy Commission, January 1995.

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Managing Director

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REGULATORY SUBMISSIONS (cont'd.)

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Transcontinental Gas Pipe Line Corporation; Docket No. RP93-136-000 (Proposed Firm-to-the-Wellhead Rate Design), Federal Energy Regulatory Commission, January 1994.

In re: Sierra Pacific's Proposed Nomination for Service on Tuscarora Gas Pipeline; Docket No. 93-2035, The Public Service Commission of Nevada, July 1993.

Employment Gains in Louisiana from Entergy-Gulf States Utilities Merger, Louisiana Public Utilities Commission, December 1992.

Employment Gains to the Beaumont Area from Entergy-Gulf States Utilities Merger, Texas Public Utilities Commission, August 1992.

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In Re: Pipeline Service Obligations; Docket No. RM91-11-000; Revisions to Regulations Governing Self-Implementing Transportation Under Part 284 of the Commission's Regulations; Docket No. RM91-3-000; Revisions to the Purchased Gas Adjustment Regulations; Docket No. RM90-15-000, Federal Energy Regulatory Commission, May 1991.

In the Matter of Natural Gas Pipeline Company of America; Docket No. CP89-1281 (Gas Inventory Charge Proposal), Federal Energy Regulatory Commission, January 1990.

In the Matter of United Gas Pipeline Company, UniSouth, Cypress Pipeline Company; Docket No. CP89-2114-000 (Proposed Certificate of Storage Abandonment by United Gas Pipeline Company), Federal Energy Regulatory Commission, December 1989.

In the Matter of Tennessee Gas Pipeline Company; Docket No. CP89-470 (Gas Inventory Charge Proposal), Federal Energy Regulatory Commission, July 1989.

In the Matter of Take-Or-Pay Allocation Proposed by Mississippi River Transmission Corporation, Federal Energy Regulatory Commission, March 1988.

In the Matter of Natural Gas Pipeline Company of America; Docket No. RP87-141-000 (Gas Inventory Charge Proposal), Federal Energy Regulatory Commission, December 1987.

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Managing Director

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Trans-Alaska Pipeline System: Docket Nos. OR 78-1-014 and OR 78-1-016 (Phase 1 Remand), Federal Energy Regulatory Commission, October 1983.

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 Los Angeles, California
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Dr. Jeffrey Leitzinger
 September 2012 – August 2016

Proceeding	Court/Commission/Agency	Docket or File	Deposition/ Trial/Hearing	Date	On Behalf Of
1. <u>In Re: Wellbutrin XL Antitrust Litigation</u>	U.S. District Court, Eastern District of Pennsylvania	Case No. 2:08-CV-2431	Deposition Hearing Deposition Deposition	March 2010 April 2011 November 2011 November 2014	Plaintiff Plaintiff Plaintiff Plaintiff
2. <u>King Drug Company of Florence, Inc., et al. v. Cephalon, Inc., et al.</u>	U.S. District Court, Eastern District of Pennsylvania	No. 06-CV-1797-MSG	Deposition Deposition Deposition	August 2011 February 2014 July 2014	Plaintiff Plaintiff Plaintiff
3. <u>In Re: Wholesale Grocery Products Antitrust Litigation</u>	U.S. District Court, District of Minnesota	Civil Action No. 09-md-02090 ADM/AJB, 09-md-02090 ADM/TNL	Deposition Hearing Deposition	December 2011 May 2012 April 2016	Plaintiff Plaintiff Plaintiff
4. <u>Altana Pharma AG, and Wyeth v. Teva Pharmaceuticals USA, Inc. and Teva Pharmaceutical Industries, Ltd.</u>	U.S. District Court, District of New Jersey	Civil Action No. 04-2355; 05-1966; 05-3920; 06-3672; 08-2877; (JLL) (CCC) on all	Deposition Trial	June 2012 June 2013	Defendant Defendant
5. <u>Apotex, Inc. and Apotex, Corp. v. Sanofi-Aventis, Sanofi-Synthelabo, Inc., Bristol-Myers Squibb Company and Bristol-Myers Squibb Sanofi Pharmaceuticals Holding Partnership</u>	Circuit Court, Broward County, Florida, 17 th Judicial Circuit	No. 11-001243	Deposition Trial	July 2012 March 2013	Plaintiff Plaintiff

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 Los Angeles, California
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 September 2012 – August 2016

Proceeding	Court/Commission/Agency	Docket or File	Deposition/ Trial/Hearing	Date	On Behalf Of
6. <u>Allergan, Inc., et al. v. Athena Cosmetics, Inc., et al.</u>	U.S. District Court, Central District of California, Southern Division	Case No. SACV07-1316 JVS (RNBx); Case No. SACV09-0328 JVS (RNBx)	Deposition	February 2013	Defendant
7. <u>Mylan Pharmaceuticals, Inc., et al. v. Warner Chilcott Public Limited Company, et al.</u>	U.S. District Court, Eastern District of Pennsylvania	CIV No. 12-3824	Deposition	May 2013	Plaintiff
8. <u>In Re: Polyurethane Foam Antitrust Litigation</u>	U.S. District Court, Northern District of Ohio	Case No. 10-MD-2196	Deposition Deposition Hearing Deposition Deposition	July 2013 January 2014 January 2014 April 2014 July 2014	Plaintiff Plaintiff Plaintiff Plaintiff Plaintiff
9. <u>Marchbanks Truck Service, Inc. d/b/a Bear Mountain Travel Stop, et al., v. Comdata Network, Inc. d/b/a Comdata Corporation, et al.</u>	U.S. District Court, Eastern District of Pennsylvania	No. 07-1078-JKG	Deposition Deposition	September 2009 August 2013	Plaintiff Plaintiff
10. <u>Astrazeneca AB, Aktiebolaget Hässle, KBI-E Inc., KBI Inc., and Astrazeneca, LP v. Apotex Corp., Apotex Inc. and Torpharm, Inc.</u>	U.S. District Court, Southern District of New York	Civil Action No. 01-CIV-9351 (BSJ)	Deposition Trial	August 2013 November 2013	Defendant Defendant

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Dr. Jeffrey Leitzinger
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Proceeding	Court/Commission/Agency	Docket or File	Deposition/ Trial/Hearing	Date	On Behalf Of
11. <u>In re: Cathode Ray Tube (CRT) Antitrust Litigation</u>	U.S. District Court, Northern District of California, San Francisco Division	Case No. 3:07-CV-5944 SC	Deposition	August 2013	Plaintiff
12. <u>In re: Prograf Antitrust Litigation</u>	U.S. District Court, District of Massachusetts	Case No. 1:11-cv-10344-RWZ	Deposition	November 2013	Plaintiff
13. <u>The Shane Group, Inc., et al., v. Blue Cross Blue Shield of Michigan</u>	U.S. District Court, Eastern District of Michigan, Southern Division	No. 2:10-cv-14360-DPH-MKM	Deposition	December 2013	Plaintiff
14. <u>Adriana M. Castro, M.D., P.A. and Sugartown Pediatrics, LLC, et al. v. Sanofi Pasteur, Inc.</u>	U.S. District Court, District of New Jersey	Action No. #11-CV-07178-JLL	Deposition	September 2014	Plaintiff
15. <u>FiTeg Inc. v. Venture Corporation, LTD., and Cebelian Holding PTE, LTD.</u>	U.S. District Court, Northern District of California, San Jose Division	Case No.: C 13-01946 BLF	Deposition	January 2015	Plaintiff
16. <u>Louisiana Wholesale Drug Co., Inc., et al., v. Schering-Plough Corporation; Upsher-Smith Laboratories; and American Home Products Corporation</u>	U.S. District Court, District of New Jersey	MDL No. 1419	Deposition	May 2015	Plaintiff
17. <u>In Re: Rail Freight Surcharge Antitrust Litigation</u>	U.S. District Court, District of Columbia	Case No. 1:07-MC-00489	Deposition	June 2015	Plaintiff

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Los Angeles, California
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Dr. Jeffrey Leitzinger
September 2012 – August 2016

Proceeding	Court/Commission/Agency	Docket or File	Deposition/ Trial/Hearing	Date	On Behalf Of
18. <u>In Re: Lidoderm Antitrust Litigation</u>	U.S. District Court, Northern District of California	No. 14-MD-02521-WHO	Deposition	July 2016	Plaintiff

Exhibit 2

Exhibit 2
List of Materials Relied Upon

Pleadings and Orders

	<u>Date</u>
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Mitsubishi (MEVSA)'s Third Supplemental Response to DPP Crago's First set of Interrogatories	02/18/16
Order In Re Class Certification with Respect to the Thomson and Mitsubishi Defendants	07/08/15
TDA's Revised Answers to Indirect-Purchaser Plaintiff's First Set of Interrogatories to Defendants	09/29/14

Correspondence

	<u>Date</u>
<u>Samsung</u>	
Letter from Michael W. Scarborough to R. Alexander Saveri and Lauren C. Russell	03/08/12

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	<u>Date</u>
Baidyaroy, Suprasad	06/07/16

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9/1/2016

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EXHIBIT F



June 20, 2012

Certification

Park IP Translations

This is to certify that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese into English of the document with bates numbers range: CHU00030679E - CHU00030683E.

A handwritten signature in cursive script, reading 'Abraham I. Holczer', is written above a horizontal line.

Abraham I. Holczer

Project Manager

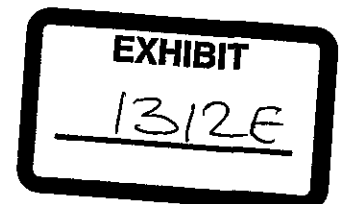
Park

Case

#

29567

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[TRANSLATION]

Mainland China *CDT Maker* Contact Meeting

[Handwritten:]

Respectfully Submitted to President Peng

Submitted for review

Urgent Document

Please deliver to Mr. Chung-Cheng (Alex) Yeh in Room 2705

Fm: Guang-Hui Dai, Total 4 pages.

Date: Oct. 09, 1998

Location: Fuzhou

Meeting: *CPTF* - Senior Manager Jing-Song (Jason) Lu, Section Chief

Attendees: Chung-Cheng (Alex) Yeh, Guang-Hui Dai, Wei-Lie Yu

PHS - Zheng-Er Shao, (Huafei) President Jian-Zhong Sheng, (Huafei)
Manager Bing Ma*SSDD* - Department Manager Myoung-Sik Lee, Zhen Yang*ORION* - Section Chief TAE SIK KONG (*TAE SIK KONG*)*LG* - Section Chief J.B.PARK (*J.B.PARK*)*IRICO (IRICO)* - Vice President Jian-She WeiI. Summary of the Production and Sales Situation/Production Plan for *CDT MAKERS*

- 1) In September 1998, the production and sales situation/production line plan was as follows:

(Chart 1)

Unit: K PCS

Maker	Size	Production, Sales, Inventory of Sept. 98			'98 Q4 Planned Production Volume (SUPPLY)				Planned Production Volume of '99
		Production	Sales	Inventory	October		Planned Production of Nov.	Planned Production of Dec.	
					Planned Production	Planned Sales			
CPTF	14"	210	215	105	150	170	150	150	1800
	15"						30	60	1710
SSDD	14"	180	185	5	150	160	150	150	1800
	15"								
PHS Huafei	14"	180	180	20	120	70-100	120	120	1600
	15"								100(SKD)
BMCC	14"	25	25	25	30		30	30	
ORION	14"		75		50	25-50	40	30	300
	15"		10		30	30	30	15	300
Irico	15"	20	40	0	20		30	40	1000
LG	14"		6		10		10	10	0
	15"		3		10		10	20	360
TTL	14"	595	686	155	510	455-510	500	490	
TTL:	15"	20	53	0	60		100	125	

English words found in the original text are *italicized*.

Translator's remarks are indicated in brackets [].

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Explanation of major points:

- A) *CPTF*: 9/E, the actual inventory of 14" finished product reached 189K. The accumulated tube inventory reached 113K. However, in order to avoid concerns by all makers about excess inventory, certain inventory figures had been withheld. It was also explained that because of expected changes to the 15" line, it should be possible to digest 14" inventory in Q4. All makers did not question this matter. In 1999, depending on the 14" market situation, it can be expected that *ONE* production *LINE* each for 14" and 15" will be retained.
- *PHS CHALLENGES CPTF* → *PHS*'s Mr. Shao claimed that *CPTM* was heard to have engaged in sales of inferior tubes in the market, and would like clarification of this situation from us. We responded with clear indication that absolutely no such situation exists.
- B) *SSDD* 14" production line's actual production capacity could reach 180 – 200K/M. Based on the production, sales and inventory data from September provided by its marketing department (deliveries to storage: 206.5K; sales: 216K; and inventory: 3.2K), it can clearly be seen that the September production and sales figures provided at the meeting were kept down. With respect to the large size production of 15" and 17", it is expected that in April 1999 and September 1999, Mainland China *TSDD* (Tianjin Samsung)/*SSDD* (Shenzhen Samsung) each plans to construct an additional production line for using in production (due to capital considerations, whether or not *SSDD* will establish a new line or import an old line from Korea has not been confirmed). A decision has not been made as to the sizes to be produced and as to which factory is to make such production. Additionally, *SSDD* has indicated that its domestic and export sales ratio is approximately 1/2 each. Department Manager Lee has also suggested that all makers propose to their headquarters that the price for 15" should be increased a bit more (maintain at least a US\$15 price difference). In addition to profit considerations, this will also avoid hastening the decline of 14"

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II. General Assessment of Demand by Mainland Customers for 14" CDT in Q4 (BY CUSTOMERS)

(Chart 2) Unit: K PCS

Customer	Estimated Demand	CDT Domestic Sales Volume	TTL Demand	Remark
ACER(SZ)	10K(CPTF) 8K(PHS)	2K(PHS)	20K	
AOC	40K(CPTF) 40K(ORION)		80K	Estimates there are 30-40k FOR domestic Sales
ADI	20K(SSDD)		20K	
COMPAL	12K(CPTF)		12K	
EMC	30K(SSDD)		30K	
GVC	10K(SSDD) 10K(ORION)		20K	
IRIC	10K(BMCC) 10K(PHS)		20K	
KFC	8K(SSDD)		8K	
LI-ON	40K(CPTF)		40	
PHS(DG/SZ)	45K(CPTF)	45K(PHS)	90K	Main domestic customer for Huafei is PHS (SZ)
SHAMROCK	10K(CPTF) 6K(SSDD)		16K	
FIC	3K(PHS)		3K	
MAG	2K(SSDD)		2K	
DTS	3K(PHS) 3K(ORION)		6K	
CHINA OTHERS		40K(ORION) 80K(SSDD) 40K(PHS) 10K(BMCC) 6K(LG)	176K	Main customer for SSDD are Beijing Founder Electronic Co and Xoccco
Total	320K	223K	543K	

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Explanation:

According to Chart 1, the total sales volume of 14" in September is 686K. Compared to the September production volume of 595K, there is an over sold phenomenon. Additionally, the estimated sales volume in October was made on the understanding of information regarding current orders as provided by all CDT MAKERS. According to the analysis of estimates of each maker on supply volume and sales volume (Chart 1) and demand according to customers (Chart 2), supply and demand still can basically remain even, which is favorable to a price increase. Additionally, with the exception of SSDD, who from the very beginning had doubts about an increase of their domestic sale price coefficient to 10.4, other makers have generally indicated unanimous determination to increase prices. For this reason, each CDT MAKER should definitely FLW their headquarters, and have full confidence in a price increase. However, SSDD Department Chief Lee has finally been persuaded by Huafei and CPTF to increase its domestic sales price quote coefficient to 10.4, and reached an agreement.

English words found in the original text are italicized.

Translator's remarks are indicated in brackets [].

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- *CPTF CHALLENGES SSDD → OVER LOADING* its production capacity greatly, which resulted in a lack of confidence in the domestic sales price at the last meeting (export price multiplied by a coefficient of 10.4). All makers also agreed. In particular, *PHS* claims that its increase in the coefficient from 10 → 10.4 has already been announced to customers. From the very beginning, *SSDD* was not confident in the increased 10.4 coefficient. However, after strong requests from all makers and President Sheng of *Huafei* saying that, even though *BMCC* did not attend the meeting, in previous communications it had already indicated that it would abide by the resolutions from the meeting, Department Manager Lee of *SSDD* reluctantly agreed after great concern.
 - *ORION CHALLENGES SSDD →* Supports its increase of the coefficient for domestic sales price and questions the low domestic price given to *LOCAL* customers by *SSDD* in southern China.
- C) *Huafei*: Although *Huafei* has 2 short *LINES*, because of the unique feature of *PHS*'s system of weekly division, the working weeks for the months of 3/6/9/12 each reach 5 weeks. In September, the production amount could reach 180K. The 15" production plan is to consider transferring 3 *LINES* from the Chubei factory to Mainland China. (Mr. Shao stated that because the production line design is consecutive, if the Chubei factory 15" production facilities are shifted, the 3 *LINES* must be transferred together). However, this plan has not been confirmed. With respect to domestic sales, it is mainly supplied by *PHS(SZ)*. Additionally, it is claimed that *PHS(TWN)* still has a 14" inventory of 10 ~20K *FOR* the small monthly demand of its European customers.
- *CPTF CHALLENGES PHS →* In October, the letter concerning the price increase to *ACER* was never issued following repeated delays. *PHS* claimed that this was because its price quote for *ACER* was not formally confirmed until the middle of the month. Also *MONITOR* customers (especially *IN USA*) are quite sensitive to "price monopolies." Unless customers definitely require a written statement, it should be handled with the utmost caution. However, the resolutions from headquarters will surely be followed. Verbally, all determined to announce the price increase to customers. On the other hand, *CPTF* indicated that *MONITOR* should be allowed to have some time to communicate with its customers regarding the price increases. When the market situation is weak, it is understandable not to confirm the price until the middle of a month. However, it is currently at peak season, and the time when all makers are confirming and stabilizing their prices. *PHS* was asked to improve its mid-month pricing practice.
- D) *ORION*: The September sales figures listed above do not include sales of 50K to *AOC*. In 9/E, the 14" inventory was below 30K. MR. Kong stated that the 15" facilities will be improved in 10/M, and that in the future it will continue to maintain 14" *ONE LINE*, 15" *ONE LINE*, and another *ONE LINE* (75% *FOR* 15", and 25% *FOR* 17"). The production capacity of each line is approximately 160 – 170K/M.

English words found in the original text are *italicized*.
 Translator's remarks are indicated in brackets [].

- *PHS CHALLENGES ORION* → *ORION*'s China offices are grabbing customers to enhance their sales performance. It has been said there was *US\$56* appearing at market price for 15", so clarification regarding whether *A*-tube or *B*-tube has been sold was requested. *ORION* claims that it has not made any sales to dealers, and ensures that there will be no customer overlap among its offices in Mainland China, and that all prices *FLW ORION H.Q.* prices. It staunchly denied such market price exists.
 - *CPTF CHALLENGES ORION* → An explanation was requested as to the disposal method for defective *AOC* tubes. *ORION* replied: The defect rate of 14" in *AOC* averages at about 0.5%. The cost of defective tubes is calculated at 75% of *A* tubes. And using a production rate of 40*K/M* to calculate the amount of *B* tubes the volume should only be 200 *PCS*. Volume should not be large. *ORION* insists that its defect rate is indeed this low; however, the other makers doubt its low defect rate.
 - *SSDD CHALLENGES ORION* → Upon investigation, Shenzhen customer *KTC* (Kangte) and *SRC* each purchased barely-passing tubes from *AOC* (*ORION'S TUBE*) in September, and it was also heard that the *ORION*'s September price for 14" was *US\$43*. There were also claims that even in September *S/T GLARE B+D* tube prices should not be at this market price. *ORION* has staunchly denied that it sold inferior tubes, and that it *OFFERED* a price of *US\$43* in September.
- E) *BMCC*: Basically because it is losing money, although it has not given up on the *CDT* market, it also won't consider selling more (14" production $\leq 30K$). With respect to 15", due to an assessment that it lacks competitive capability, temporarily its production won't be started.
- F) *LG*: Currently only has a half-line 14" production line, with a production capacity of approximately 70~80*K/M*. Internal self-use is 50*K/M*. The remaining 20 *K/M* are sold to Southeast Asia and Mainland China. No consideration is given to the production of 14" in 1999.

English words found in the original text are *italicized*.
 Translator's remarks are indicated in brackets [].

3) 1999 CDI Maker Production Plan

(Chart 3)

Units: K PCS

	Q1	Q2	Q3	Q4	Remark
CPT	300-375K/M	300-375K/M	300-375K/M	300-375K/M	2.5 LINES
PHS	130K/M	130K/M	130K/M	130K/M	2 LINES
SSDD	350K/M	350K/M	350K/M	350K/M	2 LINES
ORION	160K/M	160K/M	160K/M	160K/M	1 LINE
LG	40-80K/M	40-80K/M	40-80K/M	40-80K/M	Might discontinue production of 14"
BMCC	30K/M	30K/M	30K/M	30K/M	
TTL	1010-1125K/M	1010-1125K/M	1010-1125K/M	1010-1125K/M	

Explanation

If the supply of 14" in 1999 is estimated to be 1100K/M, the total annual supply volume will be approximately 13,200K PCS. However, SSDD and PHS all believe that the TTL DEMAND in 1999 (for 14"/15"/17") will be approximately 90,000K PCS. If the 15% estimate of PHS/SSDD for demand of 14" is used, the 1999 annual demand volume will be 13,500K PCS. From the above analysis, it can be expected that in 1999, the supply and demand relationship for 14" CDT will tend to be balanced.

III. Conclusion

1. Competition between ORION and SSDD for LOCAL customers in southern China is strong, and both parties doubt each other's claims that "domestic sale prices are unreasonable," and the sales behavior regarding "A or B tube." ORION, in addition to strongly denying the sale of B tubes and the behavior of quoting low prices, has also requested that SSDD provide accurate data for investigation and verification. Although SSDD eventually agreed to use 10.4 as the coefficient for the domestic sale price, it still appears to lack confidence in the increase of the domestic sale price.
2. SSDD has requested that all makers propose to their headquarters that the scale of price increase of the 15" be a bit larger, and that a price differential of at least US\$15 should be maintained from 14."
3. Although BMCC did not participate in the meeting, it previously communicated with Huafei that it would abide by the meeting resolution. Huafei's President Sheng is responsible for relaying the agreement of using the coefficient of 10.4 for domestic sale price.
4. According to Q4 of 1998 and 1999's supply and demand situation analysis, generally the supply and demand for 14" will be balanced whether it's in the Mainland China region or the worldwide market. Each CDT MAKER should strictly control production volume, and in particular, should not engage in OVER

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Translator's remarks are indicated in brackets [].

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LOADING the way *SSDD* did in September, in order to ensure the stability of prices.

5. The next meeting will be convened by Irico. The time and location will be discussed separately.

- End of Report - Submitted for Approval

Submitted by Employee Guang-Hui Dai
OCT. 11, 1998

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

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[Handwritten telephone number:]

0512-5191028

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

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CHU00030683E

EXHIBIT G



June 20, 2012

Certification

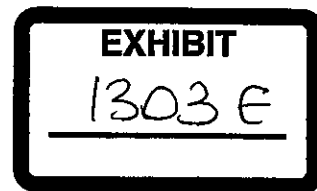
Park IP Translations

This is to certify that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese into English of the document with bates numbers range: CHU00030688E - CHU00030691E.

A handwritten signature in cursive script, reading 'Abraham I. Holczer', is written above a horizontal line.

Abraham I. Holczer

Project Manager



[TRANSLATION]

[Entire Document Handwritten]

Business Trip Report

Page 1 of 3

To: → Wei-Lie Yu [Hand-drawn star]

Date: Dec. 8-10, 1998

Location: Beijing

[Initialed:] Lu 12/11'98

Meeting Attendees: *CPT*: Wen-Chun (Tony) Cheng, Jing-Song (Jason) Lu,
 Ching-Yuan (Michael) Du, Chung-Cheng (Alex) Yeh
PHS: Shou-Li Lin, Cheng-Er Shao, Dong Liu
SSDD: MR. D. Y. Kim, M.S. Lee, etc.
LG: MR.
ORION: MR. Moon, MR. Kong... etc.
Irco: President Ma... etc.
BMCC: Wen-Chiang Fan, Hsin-Wen Huang

[In left margin:] *COPY x 1*

Content:

This is a routine China *CDT MAKER* contact meeting. Since many disputes rose from the past few meetings, it was decided at the top-level meeting held during 11/E in Seoul that the headquarters of each maker would send representatives to attend this meeting (12/9 PM). In addition, on 12/10 AM, five of the Taiwan and Korea makers will separately hold a coordination meeting.

Production Sales and Inventory statuses for respective makers:

		NOV			DEC			JAN	FEB
		Prod'n	Sales	Stock	Prod'n	Sales	Stock (C+M)	Prod'n	Prod'n
<i>CPTF</i>	14"	112	117	173	0	60	110+70	0	0
	15"	40	33	7	60	60		100	100 [Crossed out by hand]
									70-80
<i>LG</i>	14"	0	4	—	0	0	0	0	0
	15"	0	6	—	0	9	0	0	0
<i>PHILIPS</i>	14"	120	80 (⁵⁰ / ₃₀)	80	120	70 (⁵⁰ / ₂₀)	100	60	40
	15"		20	0	0	20		10	30
<i>ORION</i>	14"		30	140	70	25	70		
	15"		40	—	—	50	—	—	—
<i>IRICO</i>	15"	31	30	1	37	35		40	45
<i>BMCC</i>	14"	40	20	40	30	30	40	30	30
<i>SSDD</i>	14"	180	120	80	150	120	100+40	100	100
<i>TTL</i>	14"	452	371	373	300	305-325	(530)	190	170
	15"	71	89-99	7	97	164-174		150	145

English words found in the original text are *italicized*.
 Translator's remarks are indicated in brackets [].

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CHU00030688E

Translation

Explanation:

1. Market demand for 14" is shrinking dramatically. The market situation of all makers is poor.
2. *LG* will stop the production of 14" starting from January 1999.
3. *PHS* originally planned to transfer the 15" production line from Chubei to Huafei, but it was *hold* because the *cost* was too high. However, currently, it has 2 existing lines of 14". In December, only one line was utilized, the other line's produce equipment was converted. It is estimated that the production of 15" will begin in January, '99. Estimated that JAN/10k, FEB/30k [Underlined].
4. *BMCC* originally planned to begin the production of 15" in January. However, since neither of the facilities and materials all are presently *OK*, it is estimated that the switch will not begin until May [Underlined].

(2) Market Price Review

1. First, *PHS* pointed out that *SSDD*, *Orion*, *BMCC*, and *LG* gave quotes that were lower than the fixed current prices they have committed to for certain customers. An explanation was requested. After the makers explained the evidence to each other, *SSDD* admitted that their quote to *XOCECO* was lower than the set price, *RMB* 500- (should be 520-). *MR. D. Y. Kim* expressed regret and will adjust the price immediately.
2. *ORION* still states that since the smuggling channels were blocked, its imported *CRTs* in China have no competitive edge at all facing the quotes of *local CDT MAKER* at *RMB* (10.4). Therefore, without alternatives, it had to compete using the prices of *USD* 45-46. After a joint discussion among the attendees and agreement from *SSDD*, China Great Wall, Beijing Founder and *XOCECO* three makers' consent *ORION* quoted at low *USD* 20, which is the equivalent of a *RMB* quote

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

of *RMB* 520-. This is limited to these 3 makers only.

3. At the meeting on the morning of 12/10, it was suggested to *follow* the Japan makers' price increase\beginning on *JAN/16*, to, 17" price will be at least 5.00/*pc*.
4. The market *demand by size* in '99

October Projection			December Revision	
14"	141 <i>M</i>	149%	7.5 <i>M</i>	8%
15"	37.4 <i>M</i>	39.6%	37 <i>M</i>	39%
17"	35.4 <i>M</i>	37.5%	41 <i>M</i>	43.4%
19"	4.8 <i>M</i>	5.1%	6 <i>M</i>	6.4%
20"/21"	2.7 <i>M</i>	2.9%	2.7 <i>M</i>	2.8%
<u>TTL 94.4<i>M</i></u>			<u>94.4<i>M</i></u>	

- End of report -

[Signed:] Submitted by Employee Chung-Cheng (Alex) Yeh 12/11 '98

[Signed:] Y. M. Peng, *DEC* 16 '98

[Handwritten in a different style:]

*Yu, please *FAX* on my behalf to my younger sister (*Taipei*), and tell her to: "sell my car." I will make contact when I return. *TKS! FAX NO. AS FOLLOWS:*

To: 00886 2 28261648 Li-Hua Tai

[Signed:] Guang-Hui Tai
12/30'98

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

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CHU00030690E

Translation

0591 3970507

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

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CHU00030691E

Translation

EXHIBIT H



June 20, 2012

Certification

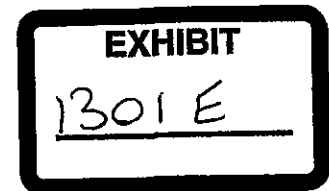
Park IP Translations

This is to certify that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese into English of the document with bates numbers range:
CHU00030695E - CHU00030697.

A handwritten signature in black ink, reading 'Abraham I. Holczer', is written over a horizontal line.

Abraham I. Holczer

Project Manager



[TRANSLATION][Stamped on the top:] *FAX OUT*[Handwritten:] *Fax to CPTC*

Respectfully submitted to Director/ Manager Cheng

China *CDT MAKER* Contact Meeting

Date: January 8, 1999

Location: Xiamen

Attendees: *CPTF*: Manager Jing-Song (Jason) Lu, Guang-Hui Tai, Wei-Lie Yu*PHS*: Sales Manager Zheng-Xi Shao, (Hua Fei) Manager
Bing Ma*SSDD*: Department Manager Ming-Zhi Li, Yang Zhen*ORION*: Section Chief *TAE SIK KONG**IRICO*: Sales Manager Wei-Sheng Li, Assistant Manager
Business Department Jun Yao, Zhao-Jie Wang.

Contents:

1. Information on Production and Sales (*IN CHINA*) of respective *CDT Makers*

UNIT: K PCS

IN CHINA		'98 DEC.			'98 TTL		'99 JAN.		'99 SKDL
		PROD.	SALES	STOCK	PROD.	SALES	PROD.	SALES	PROD.
Huafei	14"	125	95(50 ↓)	102(200)	1,357	1247	60	45	800
	15"								400
SSDD	14"	130	120	70	1620	1550	100	100	1800
	15"								700
	17"								300
BMCC	14"	37	28	40	330	290	50	15	α
	15"								α
ORION	14"		34		α	α		30	α
	15"		65		α	α		70	α
IRICO	15"	45	41	5	195	190	50	51	600
CPTF	14"	20	68	125	1,135	1,022	70	70	900
	15"	66	74	6	109	104	120	120	2400
TTL	14"	312	345	387	4,442	4,109	280	260	3,500
	15"	111	180	11	304	294	170	241	4,100
	17"	0	0	0					300

[Handwritten:]
200/ending April
320/beginning
May

[Handwritten:] Remark: the "α" volumes above will be confirmed after the meeting.

English words found in the original text are *italicized*.

Translator's remarks are indicated in brackets [].

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CHU00030695.01E

Translation

1) *CPTF*: All the data provided by our factories were close to the actual figures so we were not questioned.

2) Hua Fei:

A) *SSDD* asked why *PH* still produced 125K when it already had such a high inventory? Shao 'R explained that Hua Fei had shut down one production line which was undergoing conversion to 15" (it is expected that it will *P/P* in February and mass production will officially start in March). The other 14" line would have to be utilized. Because *PHS* defines its work month from the 25th of the previous month, so that the December work is 5-weeks long, the production volume was 125K. For this reason, *PHS* indicated at the meeting that for December's sales and inventory data, the numbers in "()" should be considered accurate. Because sales and production data have to be reported to the China Ministry of Electronic Information, they had to decorate the inventory and sales figures with window dressing. Hopefully none of the makers will publicize this and disrupt the makers adhering to the prices.

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

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CHU00030695.02E

Translation

[Stamped:] *FAX OUT*

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Translator's remarks are indicated in brackets [].

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Translation

B) Shao'R stated that *PHS*'s orders had been low and determined that *SSDD* had definitely yielded to one of its customers on absolute price and/or *PAYMENT TERMS*. He strongly protested about the way *SSDD* did it. He hoped *SSDD* would improve, otherwise they may have to fight with *SSDD* to the bitter end when they start losing customers (although he hopes that wouldn't happen). Initially *SSDD* denied the allegation, however they eventually conceded that *PAYMENT TERM* operations had already existed between them and the original *CPT* (television tube) customers. Now, it would be very difficult to do *CDT* deals without extending credit to customers. [Handwritten:] *P.S. H.P.* confirmed that a (*warehouse*) was set up in Shenzhen during Q4, '98. [Handwritten note:] [Illegible]

3) *SSDD*:

A) It is expected that in June of this year (the Tianjin factory) will start mass production of 15". Due to capital problems, it expected that the mass production of the 17" will be postponed to October, starting in Shenzhen. (The target of '99 annual production of 300K is calculated from September's mass production).

B) *CPTF* posed a question: in December, sales of all the makers fell, yet *SSDD*'s 14" sales for November and December could both reach 120K. *SSDD* did not respond. After the meeting, a member of their sales staff, Yang'R, said in private that about 30K was given to *EMC* to initially post to its accounts, though it had not yet been shipped.

C) Zhong Kang Glas production capacity is 200K/M (*CPT* + *CDT*). In January, it will start to use 10K of Shenzhen Zhong Kang Glass' pressure-molded *PANEL*. It's aggressively pursuing *LOCALization* of materials.

4) *ORION*: In December, sales of 14" were 34K units (only 4K was domestic sales and the rest were sold to Taiwan makers). All 15" were sold to Taiwan makers. In December, their inventories of 14" and 15" in Korea were 50K and 20K, respectively.

5) *BMCC*: Mass production of 15" *CDT* will start in May. [Handwritten:] Has also sent staff to Japan for a survey and plans to convert the production line to produce 17".

6) If the 14" inventory of [Handwritten: *PH*] at the end of December is 200K, and if in addition *SDD* (*M*) and *CPT* (*M*) inventories are 50K and 106K each, then the estimated inventory of 14" worldwide is around 600 to 650K [Underlined by hand].

Conclusion:

- 1) *PHS* has given inaccurate inventory figures for the previous month and has once announced that its 14" inventory this month was almost 200K, which confused *SDD* and raised questions. In the future, all the makers should provide more accurate data. If there are any warning signs, this would allow other makers to

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

respond as early as possible. Otherwise, the purpose of this meeting will be lost.

2) It has been established that *SSDD* has not been very strict with respect to its *PAYMENT TERM*, and has caused *PHS* difficulties with their sales and generated strong resistance from the customers. While the market situation is poor, it is hoped that all the makers will evenly bear the losses resulting from the fall in sales volumes.

3) The next meeting will be hosted by *SSDD*. Time: 2/3 or 2/4. Further notification will be provided.

- End of Report - Submitted for Approval

[Submitted by:] Employee Guang-Hui Tai
JAN. 09, 1999

[Handwritten:]

There were many conflicts between *PHS* and *SSDD* due to fighting over customers. That orders for 14" have dropped drastically is an undisputed fact, as well. *SSDD* has probably not followed the bottom price and *PAYMENT TERMS*. If top management continues to ignore it, then there's concern that it will be hard to maintain the price for 14" *CDT*!

[Initialed:] Jing-Song (Jason) Lu, 1/12'99

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

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CHU00030697.02E

Translation

EXHIBIT I



June 20, 2012

Certification

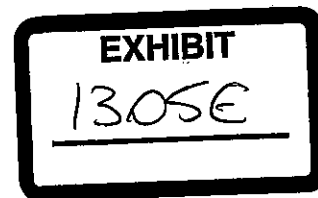
Park IP Translations

This is to certify that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese into English of the document with bates numbers range:
CHU00030819E - CHU00030822E.

A handwritten signature in black ink, which appears to read 'Abraham I. Holczer', is written over a horizontal line.

Abraham I. Holczer

Project Manager



Park

Case

#

29567

[TRANSLATION]

'99-08-10 10:02

T-556 P01

Visitation Report

[Handwritten:]

1/4

To be received by Manager Lu

Sales circulate and read ↓

Submitted for approval

→ Tony Each officer

Yu Chen 8/10/99

Jiang 8/10'99 Hua Wu 8/10-99 Ji 8/10'99

Meeting Topic: Mainland China CDT Market Exchange

Date: 99/08/05 Location: Nanjing

Meeting Participants:

CPTF: Director Liu, Manager Lu, Wei-Lie Yu

SDD: Myoung Sik Lee, Department Head; Zhen Yang

BMCC: Manager Xin-Wen Huang

ORION: Jung Saeng Park

IRICO: Manager Wei-Sheng Li, Zhao-Jie Wang

PHS: Manager Zheng-Xi Shao/TWN, Xiu-Hua Li/HF,
Si-Quan Li/HK, Dong Liu/HF

Content:

- I. *JULY/AUG* Mainland China CDT Production and Sales Information Exchange
(see Attachment 1)

Explanation:

1. SDD:

- A. Shenzhen Samsung will perform adjustments to its 14" CDT production line in '99.7 to achieve 14" and 17" CDT compatible mass production. For this reason, it only mass produced 17" CDTx10K units in July. Sales were only of the 14" CDTx123K in existing inventory.
- B. Tianjin Samsung's 15" CDT mass production capacity increased relatively quickly, with 30K in May, 80K in June, 120K in July, and 150K units in August (forecasted). Additionally, it denies allegations in the market that inferior tubes were sold during the initial phase of mass production.
- C. Due to strong sales during the 14" CDT peak season, and the fact that 17" has been in a low-prices status, Shenzhen Samsung changed the original plan for mass production of 17" CDT to production of 14" CDT, and stated that because of

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Translator's remarks are indicated in brackets [].

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Translation

changes to production lines, the original level of production efficiency had been affected. For this reason, in August, it is estimated that only 14" *CDT*×150K will be mass produced, and that there will be no means of reaching around 200K.

- D. SDD also indicated that it had provided 16" *CDT*×20K to *EMC* during the first half of the year. SEC was also responsible for part of the demand. *SDD* engages in compatible production of 15" *CDT* and 16" *CDT* in Korea, and at present, is expanding in the market (approximately 10K/M).

2. *IRICO* (*IRICO*):

- A. Mass production volume of 15" *CDT*×95K was originally planned for July. Due to inadequate supply of imported materials, however, the current actual mass production volume is approximately 85K.
- B. At present, 45% of *Irico*'s material requirements for mass production of 15" *CDT* are supplied to *LOCAL* – including *BULB/DY/GUN/COATING*. The production capacity is designed for 120K/M.
- C. It is confirmed that there are no plans for 17" *CDT* mass production in 1999, and that in the 1st *HALF* of '20, the conversion from 14" *CPT* production will be completed.

3. *ORION*:

- A. At present, the main sales targets for 15" *CDT*'s are Mainland China's *AOC/EMC*, as well as certain small customers.
- B. In spite of strong demand for 14" *CDT* in the market, only 10~20K 14" *CDT*'s were delivered to *AOC* in July and August. They could not provide any rational or satisfactory explanation for this.
- C. It was also confirmed that 14" *CDT* production will be stopped in September. All production will be focused on mass production of 15" (*MINI*) *CDT*.

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

'99-08-10 10:02

T-556 P02

[Handwritten:] To be received by Manager Lu

[Illegible]4

4. *BMCC* (BMCC)

- A. In May this year, production of 14" *CDT* was stopped. In July, only 27K units from existing inventory were sold. 8K light tubes from inventory were sold to Matsushita Philippines as part of internal transactions (1K/M).
- B. It is expected that after September, further consideration will be given to production of 14" *CDT*. The main reasons are that (1) The current 14" price is increasing; (2) There are still parts of unmatched materials remain in inventory; (3) Matsushita Japan will *CD* prices with material makers in order to increase competitiveness.

II. Price *ISSUE*:14"/15"/17" Prices (*USD/RMB*) Review Below:

	8/01 (Effective, Index: 10.4)		9/01 (Effective, Index: 10.8)	
	USD	RMB	USD	RMB
14"	52	540	52	561
15"	68	707	68	730
17"	93	967	93	1004

Remark:

- (1) Department Head Li of Shenzhen Samsung has frankly admitted that the price quoted to *EMC* for 14" *CDT* is less than *USD52 (MPR2)* and additionally stated that the price for Taiwanese makers is determined by *SDD*.
- (2) Because of the current *CDT* supply and demand situation, meeting participants decided to implement the *CDT* prices in the table above. If transactions are not with key customers, consideration must be given to increase prices on the basis of the prices listed above.
- (3) The main *CM* manufacturers are *TWN/KOREA/MAINLAND*. If any unfair *CDT* price changes occur (for example, Taiwan makers *CDT* ~ Taiwan makers *CM*; Korean makers *CDT* ~ Korean makers *CM*), a shift in *CM* orders will be inevitable. On the basis that further clarification is still required of the current market situation, whether or not 14" and 15" *CDT* prices can again be *CU USD2/PC (Index: 10.8, Effective 10/01)* [Underlined by hand] will be separately re-determined.
- (4) All the makers will finish sending notification of the above prices to customers next week (8/09 ~13).

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 Translator's remarks are indicated in brackets [].

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CHU00030820.01E
 Translation

III. Mainland China *CM* Production Demand and Production Volume for '99. (1~6)
(See Attachment 2)

IV. The next *CDT* meeting is projected to be convened on 9/02 by IRICO

~ End of report ~

[Handwritten:]

The location has not yet been confirmed. Use the IRICO visit as an opportunity to attend China *CRT Meeting*. In the beginning, representative *management* [Illegible].

1. Confidential nature of meeting: (On location were *CRT meeting* seating labels. Reporters saw and asked to interview. Already ordered to [Illegible])
2. Fully actualize headquarters' decision: The past half year and before China area has not been able to carry out each maker's decision. Has to [Illegible].
3. Price: 8/1 14" add \$2; 15" add \$5; domestic sales multiply by 10.4. 9/1 domestic sales multiply by 10.8. Absolutely cannot reduce price.

[Handwritten:] Submit to Manager

[Initialed:] Chieng-Yuan (C.Y.) Lin 8/9

[Initialed:] Chih-Chun (C.C.) Liu 8/9

[Initialed:] Chen-Cheng (Tony) Chien 8/9

[Signed:] Submitted by Wei-Lie Yu 8/9'99

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

CONFIDENTIAL – GRAND JURY MATERIAL

CHU00030820.02E

Translation

'99-08-10 10:03

T-556 P04
[Handwritten:] 4/4

[Handwritten:] Attachment 2

99(Jan – Jun) Main CM output

Unit: Kpcs

	14"		15"		17"		19"		Total
AOC	650	c	880	c	467	l	28		2025
EMC	285	s	600	s/c	450	s	70		1405
Lite-on	137	c	510	c	663	c	1		1311
PH(sz)	238	p	557	p/c	394	p/c	1		1190
ADI	210	s	730	s/t	110	h/t	0		1050
Compal	11	c	369	c/s	345	c/s	0		752
NPG	0		367	s	166	t/h	7		540
TSED	55	s	410	s/t	60	s/t	0		625
MAG	20	s	230	s/sony	230	t/sony/s	0		480
IRICO	50	p	280	i/p	20	p	2		352
FIC	15	s/p	100	l	60	l	5		180
Royal	0		0		410	l/te	13	l	423
Acer	91	p/c	237	p/c/s	79	p	0		407
PHS(dg)	36	c/p	193	c	155	c/mec	0		384
Delta	0		60	t	250	s/c/l	10		320
DW	40	s	194	l/s	6	s	0		240
Q-run	10	s	78	c/s	139	c/s	7	s	234
CGC	145	s/p/b/o/l	100	l/p	0		0		245
K-tron	170	c	29	c	3	c	0		202
SP-T	45	s/c	100	s/c	0		0		145
T-Soma	60	p	40	p	0		0		100
GVC	20	s	113	s/c/l	17	l/c	0		150
Xoo	60	s	65	s/l	20	c	0		145
KFC	8	s	79	s/c	41	L	0		128
West Lake	0		0		110	MIT			110
LG(Tontru)	10	l	80	l	10	l			100
Founder	50	b/p	40	l/p	0				90
Jiansong	0		78	c					78
KTC	60	b/s	10	I					70
KSAI	47	s	18	s/I	2	s			67
HEMC	12	s	53	s					65
LIKON	30	s	30	l/s					60
Languang	40	o/p	15	l					55
Yuanzin	10	s	22	l	17	l			49
DTS	40	p	20	p					60
Bigtide			35	p					35
Coverford	15		15		12				42
Guanli			24						24
Others	20		10		2				32
total	2690		6798		4238		144		13870
percent	19.39%		49.01%		30.56%		1.04%		100.00%

English words found in the original text are *italicized*.
 Translator's remarks are indicated in brackets [].

CONFIDENTIAL – GRAND JURY MATERIAL

CHU00030821E

Translation

'99-08-10 10:03

T-556 P03

[Handwritten:] To be received by Manager [Illegible]

[Illegible]4

[Handwritten:] Attachment 1 99.												
July				'99. August								
Type	STORE	PROD	SALE			STORE [Handwritten: "7/ES"]	PROD	SALE			STORE [Handwritten: "8/E"]	REMARK
			TTL	Local Sales	Export Sales			TTL	Local supply	Export Sales		
Philips	14" (Local)		82	50	32		2	65	45	20		2
	15" (Local)		63	63		3	61	62	62			2
	15" (Import)		121		121			90		90		
	17" (Import)		72	40	32			80	30		50	
CPT	14" (Local)	148	181	10	171	57	160	176	10	166	41	
	14" (Import)		50		50			70		70		
	15" (Local)	159	161	76	85	25	160	159	65	94	26	
	15" (Import)		406		406			348		348		
	17" (Import)		416		416			482		482		
BMCC	14" (Local)	0	27	27		8				1	7	
IRICO ORION	15" (Local)											
	15" (Local)	80.5	87	87		18.5	85	80	80		23.5	
	14" (Import)		10		10			20		20		
	15" (Import)		30		30			70		70		
	17" (Import)		25		25			30		30		
SDD	14" (Local)		123	40	83		165	165	55	110		
	15" (Local)	120	120	50	70		150	150	70	80		
	15" (Import)		230		230			230		230		
	17" (Import)		230		230			230		230		
	17" SKD	10				10						
LG	15" (Import)											
	14" (Import)											
Total	14" (Local)	0	213	127	286	67	390	406	110	297	50	
	14" (Import)	0	0	0	60	0	0	90	0	90	0	
	15" (Local)	0	416.5	276	155	46.5	456	451	277	174	51.5	
	15" (Import)	0	0	0	757	0	0	668	0	668	0	
	17" (Import)	0	10	40	703	10	0	822	30	792	0	

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Translator's remarks are indicated in brackets [].

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CHU00030822E
Translation

EXHIBIT J



June 20, 2012

Certification

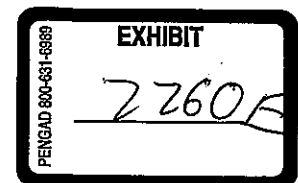
Park IP Translations

This is to certify that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese into English of the document with bates numbers range: CHU00029110E - CHU00029115E.

A handwritten signature in black ink, which appears to read 'Abraham I. Holczer', is written over a horizontal line.

Abraham I. Holczer

Project Manager



[TRANSLATION]

Visitation Report

Date: 2000/06/23(Fri.) 6-9pm Company: Philips Mr. Jim Smith, Mr. Leo Mink (via phone)

Date: 2000/06/25(Sun.) 6-9pm Company: IRICO Sales President SaTao

Contact: Wen-Chun (Tony) Cheng

Topic: TV Tube Market

I. PH TV Tube:

1. Regarding the issue which PH blamed CPT for not cooperating to raise the European 14" price to \$39, an appointment was made with Mr. Smith to exchange views and Jim carried out the review with Leo over the phone.
2. Leo stated that on 4/19 the price was proposed to be \$38 for the 2nd half of the year but around 5/25 everyone proposed to have the market price raised to \$39. CPT was only selling at \$37~37.5 for some customers right now so the price difference would be too big. He doubted if CPT could raise the price. CPT explained that Mr. Smith in the last Asian meeting also expressed that the appropriate price should be \$38 according to current European and Asian environment and 14/20" interactive environment. After contacting David Ross after the meeting, David said although Leo said to raise price to \$39 on 5/25 David already expressed that it was not easy to attain that because of the huge rise and the small price differential with 20/21" [Underlined by hand].
3. I doubted that Leo had achieved any agreement with customers and in the past he always lowered the target price with customers. Accordingly, I tried to confirm the accuracy of \$39 but Leo expressed he was still trying and hoped to gain support from CPT [Underlined by hand]. I stated that CPT always acted as a pioneer, not a trouble maker, and previous contact matched the current achievement CPT made, so it was not proper to inform the customers at the last minute to raise the price again by \$1. Besides, before current confusion regarding 20/21" is clearly improved, it is better to wait. In the meantime, CPT will also talk about the possibility of raising the price to \$38.5 [Underlined by hand] with customers. (PH indicated that the customers and targeted market of 14" and 20/21" are different so it won't have any transfer problem even if the price differential is \$5/10, respectively. I stated that current customers said 14" is sold for service only so they would abandon the production of 14" once their loss is too big after the price is raised to \$39 by \$3.)

English words found in the original text are italicized.
Translator's remarks are indicated in brackets [].

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CHU00029110.01E
Translation

4. *PH* questioned CPT again why its *PH TV* raised to \$36.8 by \$1.3 only in the internal transaction, which would cause bigger price differential with the market price. I countered by questioning why *PH CRT* didn't work together with *PH TV* to undergo price increase negotiations but waited for CPT to negotiate with *PH TV* first and didn't have to make any efforts but just used \$36.75 to undercut CPT [Underlined by hand]. Then *PH* started to explain it was beyond their control because this was related to another department. Accordingly, I asked *PH* to hint at the price adjustment first if *PH CRT* hopes to raise the price in Q4 and CPT will definitely cooperate.
5. Regarding the *Vestel* price from IRICO, it was not raised but still remained at FOB \$29.3. (\$35.5 after reaching the factories) [Underlined by hand] *PH* hopes CPT can negotiate again with IRICO to maintain a moderate price differential. I stated that further contact will be made but IRICO already felt unhappy about *PH*'s constant request which hopes the price differential between IRICO and *PH* can be curbed to \$0.5. (I stated that CPT sells 15" *cdt* at \$66 but IRICO still cannot sell any at \$58.) *Jim* encouraged me to ask IRICO to maintain the price differential around \$1 and I expressed that I would try my best to negotiate with IRICO.
6. CPT stated that it was very ridiculous that the current set price for 14" was \$38~39 but 20/21" in Europe was still DM 97~100/107~110, only US\$45/50, which was even lower than the price in China. Under such a condition, it's not healthy to ask CPT and IRICO, which only have one product, 14", to take the risk of irritating customers. *Jim* agreed that with full utilization rate the price should not be so weak. *Leo* stated that currently the negotiations with other European picture tube companies, (such as SEC and *Thomson*), didn't go smoothly. *Jim* said *Leo* should notify him earlier but he would ask SEC to pay attention.

English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

CONFIDENTIAL – GRAND JURY MATERIAL

CHU00029110.02E
Translation

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CONFIDENTIAL – GRAND JURY MATERIAL

CHU00029111E
Translation

According to *Leo*, for the short time it will be very difficult to have a reasonable price for 20/21" in the European market and the price can only be raised by \$0.5 at most each time. So there will still be a huge difference of \$13 from the reasonable price differential of \$18~20.

7. After the meeting, *Jim* talked to me alone and expressed that the expectation for next year's market is not as good as for this year but the CPT production, on the contrary, will increase from 3M this year to 4 M, which will cause big impact on the market. Accordingly, he hoped CPT could have a second thought. I said that CPT didn't intend to disturb the market and it is a sincere gesture to limit itself from taking orders from customers which have conflicting interests or to inform *PH* first before taking orders. Besides, the growth in quantity this year is mostly from CPT's original own customers and CPT didn't fight for orders viciously against *PH*. Next year, CPT will introduce 15" flat tube but the impact should not be too big. *Jim* still hopes CPT can control the production quantity.

II. IRICO picture tube:

1. President Sa is responsible for all external purchase and external sales. Regarding sales, he assigned 14" mainly to *Vestel* and *Thomson* [Underlined by hand] and would start to promote 21" and 15" 0.28.

2. IRICO's business plan:

product	lines	production capacity	'99 sales	'00 target	
14"	2	3.6M	2.9	3.2	
21"	2	3.6	3.1	2.7	
25"	1	1.15	1.1	1.15	
15"0.28	1	1.5	1.1	1.25	
total	6	9.85	8.2	8.3	

- a. 14" sold to *Vestel* 1.5M, *Thomson* 0.2M (initial quoted price, \$29.5 fob, will be changed to \$31 fob = \$32 cif) [Underlined by hand] internal sales 0.9M, Hong Kong 0.6M
- b. Current inventory for 21", 100k, is normal. This year, the production line is changed to 25/29" so production is less than last year. China's market is integrating but there are still many difficulties [Underlined by hand].

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CONFIDENTIAL – GRAND JURY MATERIAL

CHU00029112.01E
Translation

3. Regarding *Vestel's* sales, President Sa admitted that they are still selling at \$29.3, the increased price since April. (\$35.5 factory price) After meeting with *PH* and CPT in Xian, he had already tried to ask *Vestel* to raise the price again to \$31(factory price \$37.5) but immediately was accused by *PH* of anti-dumping tax. *Vestel* understands *PH* is also accusing *Vestel* of dumping. Currently, the price is raised by \$3 with the European customers, who account for 80% of all customers, but things are still in negotiation. In order to avoid too much fluctuation in price, it is hoped that *IRICO* and *Vestel* will share the rising cost after the case of dumping is established. June and July are the traditional low season for colored TV in China Mainland so *IRICO* made an agreement with *Vestel* to keep the current price unchanged until the end of July [Underlined by hand].
4. I reported how the prices increased in Asia and Europe and hoped *IRICO* could also respond but President Sa expressed that its trading volume with *Vestel* is already lowered to 1.5 M from the targeted 2.0M at the beginning of this year and the delivery quantity in June dropped to 60k from the regular 120k/m (but it already rose to 80k again). [Underlined by hand] Since the supply quantity cannot be raised and the service to *Vestel* is poor, the higher the price, the better it is. But it is hoped to maintain at least the price differential of \$1.5 otherwise *IRICO* will suffer bigger impact when the market becomes better. *IRICO* hoped to have one more month to observe. When the market becomes better in August, it can carry out a review again regarding the opportunity to raise prices [Underlined by hand].
5. As for 21", recent market is really not good. The agreed price among makers is *rmb* 1050, but actually is only *rmb* 750. The price of Panda brand is the lowest and current market inventory should still be 2.0 M. Although makers intended to integrate and decrease production to 3.0M the biggest maker, Changhong, didn't want to cooperate and even increased its production to 3.0M [Underlined by hand]. In the integrating meeting held the other day, all of the picture tube makers were called to the meeting and asked to cut the price to *rmb* 430 or they would lose the orders but picture tube makers were united, intending to cut production but not the price [Underlined by hand].

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Translator's remarks are indicated in brackets [].

CONFIDENTIAL – GRAND JURY MATERIAL

CHU00029112.02E
Translation

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CHU00029113E
Translation

6. Currently, IRICO's internal sale price for 21" picture tube is rmb 530 [Underlined by hand] and there are no direct customers for external sales. Customers are all domestic customers who want to save tax and sell at \$48~48.5 (*etc*). President Sa stated that that price is higher than those of Hitachi and Shanghai Novel CPT Co., etc. [Underlined by hand] The price which Asia understands is too much higher than the actual prices. Companies in Turkey, such as *Vestel*, *Beko* and *Profilo*, have Hitachi as their core products and Novel CPT as supplementary core products. IRICO still doesn't have a chance. He also agreed to cooperate with Asian makers who hope to have a reasonable price at \$54.5(*etc*). But he also expressed that IRICO was not the key and IRICO could take the lead to raise the price when the market is still asking for reduction of production and promotion of sales.

7. 800k of 15" 0.28mm tube will be produced in the first half of the year [Underlined by hand]. Because of the melting problem of *DY*'s varnish hot there were many returned goods. Although the problem was resolved, sales didn't improve. Inventory has reached 600k. There was much pressure to sell and they hoped CPT can give them some advice. Samples had already been sent to *AOC*, *EMC* and *Vestel*, but there was no progress. CaiHuang used *PH*'s falling price to make IRICO decrease the price again from \$60 to \$58 [Underlined by hand]. Impression of Huangqi was not good, either. I also stated that *PH* didn't do business with Huangqi but raised price by \$2 to \$66~67 level. As for the trouble situation of IRICO, CPT hopes IRICO can contact CPT first after samples are approved and before negotiating price and quantity so as to avoid confusion.

8. Toshiba became share holder by investing equipment. Retired technical personnel from Toshiba were hired to as instructors. However, it was felt that Toshiba was not too enthusiastic in transferring technology. If there is any opportunity IRICO hopes to cooperate with CPT. I will send out invitation letters to invite them to visit CPT in November and December [Underlined by hand]. (The procedure will take about half a year.)

-End of report- Respectfully submitted for approval

Sales Wen-Chun (Tony) Cheng

English words found in the original text are *italicized*.
 Translator's remarks are indicated in brackets [].

CONFIDENTIAL – GRAND JURY MATERIAL

CHU00029114E
 Translation

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English words found in the original text are *italicized*.
Translator's remarks are indicated in brackets [].

CONFIDENTIAL – GRAND JURY MATERIAL

CHU00029115E
Translation

接洽報告

日期: 89年6月23日(五) 6~9pm 廠商 Philips Mr. Jim Smith, Mr. Leo Mink(電話)

日期: 89年6月25日(日) 6~9pm 廠商 彩虹 業務 沙濤總經理

接洽: 鄭文俊

主旨: TV管市場

一. PH TV管部份:

1. 針對PH指責華映在歐洲14"售價未配合調漲至\$39一事, 與Mr. Smith約見溝通, Jim遂與Leo接通進行檢討。
2. Leo說明雖在4/19所提議為下半年以\$38進行, 但在5/25前後均提議將市場價格調升至\$39, 質疑現華映在某些客戶處僅銷售\$37~37.5, 致差價過大, 無法推展。華映說明在前次亞洲大會中, Mr. Smith亦表示以現有歐亞及14/20"間互動環境, 認為較適合之價位應在\$38。會後與David Ross連繫, David稱5/25時, Leo雖說要調升至\$39, 但David已表示可能在漲幅過大且與20/21"差距過小, 並不易達成。
3. 職質疑Leo迄今並未與客戶達成任何協議且以往其與客戶總是再由目標價退縮, 希確認其所謂\$39之真確性, Leo表示現仍在撐, 希望華映能支持。職表示華映以往一直在做先鋒, 不是搗蛋的公司, 之前的連繫與現華映之達成結果符合, 現臨時再通知客戶即改再調高\$1並不適當, 且在現有20/21"亂象未有較明確的改善之前, 最好能再觀察一下。華映也會在此同時, 與客戶洽議將售價調高至\$38.5。(PH表示14"與20/21"客戶及市場對象不同, 即使差價僅各\$5/10, 也不會有移轉的問題, 職表示現有客戶表示14"純屬服務機種, 售價一次漲\$3, 至\$39, 虧損過大的情況下, 將放棄14"之生產。)
4. PH再質疑華映為何在其PH TV部門之內部交易僅漲\$1.3為\$36.8, 如此與市場之價差將更大。職反質疑這段時間何以PH CRT全不與PH TV進行調漲協商, 待華映與PH TV一番談判後, 不費吹灰之力, 遂以\$36.75來undercut華映。PH才解釋此為另一跨部門機能, 不是他們所能控制的。職遂要求若PH CRT希在Q4調漲的話, 請PH先去提示價位, 華映絕對可以配合。
5. 對於大陸彩虹在Vestel的售價仍維持在FOB \$29.3 (等於到廠\$35.5)未調漲, PH希華映可再與彩虹協調不要將價差拉得太大。職表示將再與彩虹連繫, 但PH一再希望彩虹與PH售價差\$0.5以內, 造成彩虹之不諒解(職表示15"cdt華映賣\$66, 彩虹賣\$58都還賣不出去)。Jim表示應可請彩虹試著將價格維持約\$1的差距, 職表示將努力協商看看。
6. 華映說明現14"以\$38~39定價, 20/21"在歐洲卻仍在DM 97~100/107~110, 僅及US\$ 45/50, 比中國大陸還低, 實在是滑天下之大稽。如此結構硬要僅有14"單項產品的華映及彩虹去犯惱怒客戶之險, 並不是很健康的作法。Jim亦認為現以全滿稼動, 售價不應如此軟弱。Leo表示與現有歐洲其他映管(如三星與Thomson)之協商並不順利, Jim表示Leo應及早讓他知道, 他會請三星注



第四章 各工程規劃進度

工程名稱	規劃負責人	設計單位	發包資料 預計 實際	發包完成 預計 實際	承包商	預計入廠 施工時間	目前進度	備註
1. 廠房建築工程	洪源良	鴻昇	6/5	6/5	宜鋼	4月24日	發包資料開單中 如鋼骨工程進度	
2. 廠房主體工程	郭明輝	鴻昇	6/5	6/5	中乙建	1月18日	地下工程施工中	
3. 廠房外圍工程	傅金印	鴻昇	6/20	6/31	永宏建	7月1日	備料中	
4. Cooling/外圍工程	郭明輝	CPT/鴻昇	6/20	6/31	台灣三益	7月30日	規劃/設計中	
5. 供電系統	郭明輝	動致	5/12	5/31	台灣三益	7月30日	發包完成	
6. 空壓/換氣系統	劉慶芳	動致			--	7月30日	5/2圖面到換路	
7. 內家(含V/F規格)	王冠峰	動致			--	7月30日	5/17補充資料二及	
8. BV/C電氣	吳保中	動致			--	7月30日	備單到採購	
9. 無塵電機	蔡國輝	動致			--	7月30日	補充資料三5/15到採購	
10. 製純淨水/廢水排流	劉慶芳	動致	5/15	5/15	--	8月15日	5/24發包中	
11. 超純水設備	林瑞均	廣南	3/31	3/31	日昇	8月15日	6/8 kick off	
12. 純淨氣體/BUILD gas	謝宇傑	動致	5/15	5/24	--	7月30日	5/24發包中	
13. PCV	謝宇傑	動致	5/15	5/24	--	8月15日	5/24發包中	
14. 電氣系統	溫益川/王冠峰	動致	5/20	5/24	--	8月15日	5/24發包中	
15. 烘箱設備	謝宇傑	廣南	6/15	7/15	--	12月31日	發包資料準備中	
16. 中央集塵系統	陳清欣	動致	5/15	5/24	--	9月15日	5/24發包中	
17. 廢水系統	陳清欣	動致	5/15	5/24	--	8月31日	5/24發包中	
18. 磁帶/綠地	王冠峰	動致	2/15	2/29	瑞明	2月29日	接洽已完減85%	
19. 實驗測試	陳清欣	--		3/15	佳友		已完減一次測試	
20. 大車測試	陳清欣	--	2/31		--		供料對進行	
21. 全廠監控	吳保中	TFT動力	5/15	6/15	--	9月15日	發包資料準備中	
22. 儀器設備測試(含儀器/傳感)	吳保中	TFT動力	5/15	6/15	--	9月15日	發包資料準備中	
23. 一般電機	蔡國輝	總務處	5/15	6/15	--	8月1日	6/8發包中	
24. 中央系統	洪源良	總務處	11/1	12/1	--	12月31日	供料對進行	

TFT-II SIP工地事務所製作

2000/6/13

意。但依Leo之說法，短期內歐市之20/21"價位要合理化將極困難，頂多每次只能調漲\$0.5，與應有之價差\$18~20，仍有\$13之大差距。

7. Jim在會後單獨向職表達明年之市場預期不如今年，但華映產出反而再從今年的3M提升至4M，對市場的影響會很大，請華映考慮。職說明並無意擾亂市場，在某些有衝突之客戶處的接單給予限制或先與PH照會都是誠意的表現，今年數量的成長大部份都是由華映原有的專屬客戶來的，未惡性與PH搶單，明年還會導入15"全平管，影響應不致過大，Jim還是希望華映能控制產量。

二. 彩虹映管部份：

1. 沙總負責所有外購外銷工作，銷售部份以14"給Vestel, Thomson為主，近期將開始推展21"及15" 0.28。

2. 彩虹之事業計劃：

生產	線	產能	'99銷	'00目標
14"	2	3.6M	2.9	3.2
21"	2	3.6	3.1	2.7
25"	1	1.15	1.1	1.15
15"0.28	1	1.5	1.1	1.25
total	6	9.85	8.2	8.3

- a. 14"售Vestel 1.5M, Thomson 0.2M (初報價\$29.5fob, 將改報\$31fob=\$32cif), 內銷0.9M, 香港0.6M。
- b. 21"現庫存100k算正常，今年因改線為25/29"故產出較去年少，大陸市場正整合中，但仍有不少困難。
3. 就Vestel之銷售部份，沙總承認現仍以四月調漲的\$29.3 (到廠\$35.5)銷售，前次在西安與PH及華映開會後，即曾試圖向Vestel要求再調漲至\$31 (到廠\$37.5)，但隨即遭PH控訴的反傾銷稅，Vestel瞭解PH現亦向Vestel控告整機傾銷，現雖亦向銷售比例達80%的歐洲客戶調漲\$3，但也還在洽議中，為避免售價過度波動，希彩虹與Vestel共同分攤傾銷成立後之成本上漲，由於六、七月為大陸地區彩色電視之傳統淡季，彩虹遂與Vestel協議現價暫時不動至七月底。
4. 職表達在亞洲與歐洲價位上漲之進度，並希彩虹能共襄盛舉，沙總表示與Vestel之交易量從年初預定的2.0M調降至今1.5M，六月交貨量從以往120k/m大幅降低至60k (現再提升至80k)，下半年的供貨量無法上升，對Vestel的服務很差，售價當然愈高愈好，但希望能至少保持\$1.5的價差，否則日後市場反轉，在有傾銷懲處下，其他地區的客戶未及開拓，彩虹會受到較大之傷害，彩虹希望能再觀察一個月，八月市場較佳時期再檢討掌握時機調漲。
5. 21"近期之市場的確不佳，整機廠的協議售價在rmb 1050，但實際只有rmb 750，以熊貓牌最低，現市場庫存應仍有2.0M，整機廠雖意欲整合減產3.0M，但最大的長虹卻不參加還增產3.0M，日前整合會議中同時把映管廠叫到一起要求誰不降價至rmb 430就不給單，映管廠倒是很團結的打算減產不降價。

٢٠٠

CPTM PRODUCTION-SALES-STOCK FORECAST (MAY 2000)

10-11-12

TUBE TYPE	13V MNN			19V	20V	TV	13V HRSS			14V HRSS			16V	DSP	GRAND	
	PLT-A	PLT-B	TOTAL				PLT-A	PLT-D	TOTAL	PLT-C	PLT-D	TOTAL				HR SS
Opening Stock																
Prod	Target	405100	226500	631600	174880	8720	815200	0	184145	184145	85500	139800	225300	174700	584145	1399345
	Output	421596	229476	651072	144955	8078	804105	14672	203328	218000	88660	171050	259710	179685	657395	1461500
	Y / UK Bare Tubes	0	0	0	30600	0	30600	0	0	0	0	0	0	0	0	30600
	WH 1 Returned	13104	176	13280	0	2	13282	8352	4800	13152	1152	16968	18120	11244	42516	55798
Sales	WH 2 Returned	0	305	305	650	57	1012	10206	0	10206	1440	19746	21186	4911	36303	37315
	Actual Output	408892	228998	637890	144305	8021	803106	14672	203328	218000	88660	171050	259710	179685	657395	1461500
	% Age Achieved	100.8%	101.1%	100.9%	100.0%	92.0%	100.6%	-	107.8%	105.7%	100.7%	96.1%	97.8%	93.6%	99.0%	100.0%
	Revised Target	337585	170993	508578	164545	9316	682439	52028	221196	273224	79100	167428	246528	200100	719852	1402291
Sales	5月份產銷會目標	326257	165114	491371	163795	8910	664076	47841	203343	251184	56247	119049	175296	213696	640176	1304252
	Sales	340316	172294	512610	164545	9316	686471	53464	219760	273224	78352	168176	246528	200100	719852	1406323
	Sales Returned	30	0	30	9	1	40	1748	0	1748	0	2318	2318	2980	7046	7086
	Actual Sales	340286	172294	512580	164536	9315	686471	53464	219760	273224	78352	168176	246528	200100	719852	1406323
5/E	Replacement	6	0	6	0	9	15	0	0	0	0	0	0	0	0	15
	Sample(s)	7	0	7	0	8	15	3	0	3	0	18	18	9	30	45
	Revised %	100.8%	100.8%	100.8%	100.0%	100.0%	100.6%	99.4%	99.4%	99.4%	99.1%	99.1%	99.1%	98.5%	99.0%	99.8%
	產銷會目標達成率	104.3%	104.3%	104.3%	100.5%	104.5%	103.4%	108.1%	108.1%	108.1%	139.3%	139.3%	139.3%	92.2%	111.3%	107.3%
正常管	Total	110283	88158	198441	30640	938	230019	3605	25088	28693	2436	11104	13540	67623	109856	339875
	可供銷售	110283	88158	198441	33990	4207	236638	9989	29712	39701	17604	19504	37108	94344	171153	407791
	下月備銷	0	0	0	0	0	0	0	0	0	0	1056	1056	3528	4584	4584
	可供應售	0	0	0	0	0	0	0	0	0	0	4176	4176	5250	9426	9556
管	下月備銷	0	0	0	130	0	130	0	0	0	0	4176	4176	5250	9426	9556
	小計	0	0	0	130	0	130	0	0	0	0	5232	5232	8778	14010	14140

1. 預計生產達成：整體生產運作，L#3大管製程穩定性稍欠理想，品位待增強，致20V項未達目標；D部L#7 14V HRSS 稍低目標，主伏先整理WH退管所致，計整頓~39K 轉銷售週轉；C部L#5 16V HRSS 未達計劃要求，主前段製程品位待優化增強所致；餘均順利超目標達成！前5月份整體總淨產出1,398,987 pcs，達成率100.0%。

2. 預計銷售達成：整體銷售運作依產銷會目標追控，僅 16V HRSS 因客戶發動勸延單而未達目標外，除 TYPES 強調團隊合作擴大產銷有成，均順利超目標達成多！預 5 月份整體銷售 1,399,237 pcs 達成率 107.3 %。（如含銷退 7,086 pcs，實突破 1400K！）

3. 預計成品庫存：廠務最大產出用功自律，業務減單促銷有成，產銷量相當均臨 1400K，成品庫存顯現上升，主廠務整頓 CRA 管轉產銷週轉，有力削減，預 5/9 成品庫存較前上升 29,919 pcs 至 421,931 pcs = CTV 236,768 pcs + CDT 185,163 pcs.

聯威期滿呈 26/05/2000

2000年12月31日 星期三 第1311期 第1311期

聯 威 研 究 呈 26/05/2000

6. 目前彩虹21"映管內銷價rmb 530，外銷沒有什麼直接客戶，都是一些內地客戶以保稅方式賣\$48-48.5(itc)，沙總表示此價格較日立及永新等公司都還高，亞洲所瞭解的價位比實際情況高太多，目前土耳其的Vestel, Beko, Profilo等就是以日立為主，永新為輔，彩虹還沒機會。對於亞洲地區廠商希望價格能夠合理化至\$54.5(itc)亦表贊同配合，但表示彩虹不是關鍵，在市場遇漲減產或促銷的情況下，彩虹無法先行去漲。
7. 15" 0.28mm管在上半年將生產800k，因DY之凡立膠熱融化問題遭逢大量退貨，現雖解決，銷售仍然不行，庫存達600k。最近有很大的銷售壓力，請華映指點迷津，現已送樣給AOC, EMC, Vestel, 但都沒什麼進展。彩皇以PH跌價來要脅，故不得不再從\$60降為\$58，對皇旗整體觀感也不是很好。職同時說明PH不但未與皇旗交易，近期還在市場上調漲\$2，到\$66-67的水準，對於彩虹的困境，希望在其樣品通過要洽談價位數量前，能跟華映連繫一下，免得造成混亂。
8. 現以設備投資的方式讓東芝入股，同時聘請東芝技術的退休人員指導，感覺東芝在移轉技術上沒有很積極，若有機會希望能和華映合作。職將發邀請函請其於11/12月來訪。(手續需時約半年)

以上報告 恭呈核示

業務 鄭文俊

Revised: 05-E0

Unit: PC

CPTM PRODUCTION-SALES-STOCK FORECAST ANALYSIS

(FOR MONTH OF MAY 2000)

Date: 26-May

	PRODUCTION				SALES				STOCK			
	Last Month	This Month	Diff (+/-)	%Age Changed	Last Month	This Month	Diff (+/-)	%Age Changed	Last Month	This Month	Diff (+/-)	%Age Changed
13V MNN	407694	637487	229793	56.4%	510324	512580	2256	0.4%	227026	285554	125169	170.8%
19V	146732	174905	28173	19.2%	157857	164536	6679	4.2%	105504	23110	11010	47.6%
20V	8628	8019	-609	-7.1%	8282	9315	1033	12.5%	6392	5464	4207	-23.0%
SS	316632	194642	-121990	-38.5%	230718	271476	40758	17.7%	124857	108080	39701	-63.3%
ST	0	0	0	-	0	0	0	-	0	0	0	-
14V HR	180656	220404	39748	22.0%	233694	244210	10516	4.5%	361026	47296	42340	-10.5%
16V HR	310163	163530	-146633	-47.3%	271208	197120	-74088	-27.3%	203116	134790	103122	-23.5%

1. 生產比較：業務銷售前導 CTV 多產庫存，CDT 14V / 16V HRSS 生產線優化工事多，直接減少稼動產出，唯廠務致力最大產出用

功並強化 WH 退管整理整頓，致整體產出較前增加 28,482 pcs，微幅成長 2.1 %。

2. 銷售比較：(a) 與上個月銷售比較，除 16V HRSS 項受客戶刪延單影響呈現較前衰退外，餘 TYPES 銷售均維持水平或小幅成長，唯 16V HRSS 衰退阻突破，致整體銷售較前少賣 12,846 pcs，微幅衰退 0.9 %。

(b) 與去年同期銷售之比較，除 14V / 16V HRSS 項外，餘均需求增強多，多賣 371,316 pcs，成長 36.1 %。

3. 庫存比較：5 月運作，生產 / 銷售總量相當均隔 1400K，唯廠務加強 WH 退管整理整頓確實有成，貢獻產銷週轉，致整體成品庫存較前上升 29,919 pcs，漲幅 7.6 %。

職 戴朝淵 呈 26/05/2000

EXHIBIT K

STATE of NEW YORK)
)
COUNTY of NEW YORK)

ss:

CERTIFICATE OF ACCURACY

This is to certify that the attached document, “SDCRT-0087694 – SDCRT-0087698”, originally written in *Korean* is, to the best of our knowledge and belief, a true, accurate, and complete translation into *English*.

Dated: January 9, 2013


Seth Wargo
Consortra Translations

Sworn to and signed before ME this
9th day of January,
2013.


Notary Public

JAMES G MAMERA
Notary Public, State of New York
No. 01MA6157195
Qualified in New York County
Commission Expires Dec. 4, 2014

Color CRT Industry Meeting Results Report

■ Time / Place: May 10~12, 2001/Shanghai Dingshanhu Taiyangdao Hotel meeting room

■ Attendees:

BMCC - Shin Chung Yang (Vice president), Moon Kang Bum (General Manager) & 2 others
 SEG - Sung Jeon Sohn (President), Mr. Gook Gyoong Yang (General Manager) & others
 LG Changsha - Ah Pyung Yang (General Manager)
 Guangdong CPT - Choon Gyu Ha (Vice president), Wee Hun Oh (General Manager)
 Irico - Secretary Gyu. Doh, General Manager Gun Sul Wee
 Philips - Kang Kim (Consultant), Soo Hwa Lee (Sales Team Manager)
 Shanghai Yongxin - Ga Chon. Ju (President), Mr. Jang (Vice President), Moon Eui Bun (Manager)
 and 5 others (HOST)
 SDI - Executive Director Gwan Tae Choi, Mr. Rim Bong Wang (Manager)

■ Main issues

A) CRT company inventories at the end of April

(Unit: 10K)

	BMCC	Philips	Irico	LG Changsha	Guangdong CPT	SEG	Shanghai Yongxin	SDI	Total
14"	22.7	-	37.3	-	-	-	-	-	60
21"	5.9	1.6	3.5	2.7	0	2.2	1.2	0.3	17.4
21"DF	0	-	-	-	-	-	-	0.1	0.1
25"	-	8.6	6.4	6	27.4	-	12.3	0.4	61.1
25"DF	-	-	3	-	-	-	-	0	3
29"HF	-	-	-	-	8.1	-	-	0.6	8.7
29"SP	11.7	21.2	-	2.9	15.4	-	37.9	0	89.1
29"DF	3.5	-	-	10.1	-	-	-	0.5	14.1
34"	1.2	-	-	-	-	7	10.1	-	18.3
Total	45	31.4	50.2	21.7	50.9	9.2	61.5	1.9	271.8

Note: Above inventories do not reflect substantial portion of the inventories at the storage being operated near the SET MAKERS (Changxing, Shenzhen, etc.) and also do not include Thomson's inventory. If the actual numbers are reflected, the industry representatives agree that the total would be over 3,500K.

B) Particulars Regarding Line operation status of each company

Philips:

Currently, the CRT sale is extremely difficult. This is because of sharp decrease in production volume and tube purchases caused by excessive SET inventories of the Set Makers in the past few years. Recently, the sales volume of 29" reached 46% of the total sales, but it will take several months to empty the inventories based on the current production volume.

Therefore, stopping production is an absolutely necessary direction. We only need to discuss for how long the production should be suspended.

IRICO:

Considering various circumstances, this company is the most burdened. They have introduced new models (25"DF/29"DF) in the market, but has high defective product rate and high production costs in addition to low sales. The market appears to have almost reached saturation and it seems difficult to expect significant demand. It seems proper action is needed to overcome the situation.

SEG-Hitachi:

The relevant department of the central government is not interested in the industry's current difficult situation and it will probably not get involved in the future either. The CRT market is completely open and competition is severe. Though uniform CRT prices have been set many times, ultimately thorough enforcement is more important than the price.

Given the current circumstance with excessive inventory, a specific schedule or goals should be set (e.g., reduce 29" inventory down below 500K, etc.) and take action. The difficulty should be overcome wisely. The purchase price of GLASS should be lowered. The price for 29"DF was drastically decreased to RMB1,530 (cash/CIF) so 1,500 won could also appear soon. The market situation will absolutely not turn before August and all Set-Makers have plans to either decrease or completely stop production in May and June.

Therefore, the CRT companies should look at the current reality at it is and operate the LINEs (including stopping production) considering their respective situation .

BMCC:

Production on the 29" SF line has been stopped for the past consecutive 101 days and some other models as well have been stopped based on the circumstances. While many industry meetings were held where many agreements were made, few were actually executed as promised. Therefore we must see the error of our past ways. If we use CRT resources effectively we can stabilize the price. The price can even be increased by about 50 won. It is also important to not only set the lowest sales price but also to manage inventory at a reasonable level. We must decisively suspend production considering the current inventory.

Shanghai Yongxin:

How should we determine price for the 29"? We should stabilize the price even if we have to pay the price by stopping production. If the decision is followed, the price could recover up to 1,050 won from the current 1,000 won level. If that happens, it will also be helpful for the 21" & 25" sales. We should set a reasonable price with investment in consideration. We must refrain from sales below cost. At the time of pricing, the price of imported tubes should also be considered.

Guangdong CPT:

If we had carried out what was decided in the Hainan meeting, we would not be in such a difficult situation. We plan to stop all production once we use all the imported production material. We must have the GLASS prices lowered. We also need to lower the import duties by making a request to the government.

LG Changsha:

29" DF line hasn't been in regular operation since the line started production even operating only a few days of production in April. TUBE inventory with the Set Makers has been greatly reduced, but it seems the CRT industry has a greater inventory than last year. It seems inevitable that production must stop.

Samsung SDI:

We need to reflect on the past, prepare necessary countermeasures, and find a future direction.

Top 5 makers (Changhong, KONKA, TCL, Skyworth, VEL) retain 60% of the more than 8,Mil. SET inventory, CRT inventories of SET-Makers are 1.7 Mil, and CRT inventories of Tube-Makers are more than 2.7 Mil. which shows substantial changes in the inventory not only in volume but also in product type compared to the same time last year.

We need to stop production for 2 weeks every month during May, June and July and consume the inventory. A solution by the government appears unlikely so the industry needs to rely on itself to overcome the difficult situation.

We believe setting the price for the next three months will be helpful for purging the inventory as well as for stabilizing the market..

We do not need to worry about imported TUBE[S] shocking the China market as it is not like what it was in the past.

Rather than Samsung or LG, Toshiba or Thomson may be greater variables.

■ Meeting results

- CRT sales price:

29" SF: 1,000 won (till June 12 based on a 6 month promissory note, 1,050 estimated after June 12)

29" HF: 900 won (" 950 ")

25" MS: 680 " , ? ")

21" MS: 475 " , ? ")

21" MS Export: U\$ 47.50 (FOB port)

- Guidelines for reasonable inventory management (29"SF)

Guangdong CPT - 100K / each line

Shanghai Yongxin - 100K / each line

Philips Nanjing - 60K / each line

Samsung SDI - 30K / each line

BMCC - 70K / each line

LG Changsha - 100K / each line

- GLASS purchases should be made following the results reviewed at the meeting

29" RMB 300-330 P&F

25" RMB 200-220 P&F

21" RMB 140 P&F

We have reached a final agreement at this meeting based on the draft made during the April meeting hosted by SEG-HITACHI, and the translation of the details is as follows.

Subject: Meeting bulletin

Details: The CRT industry held a CRT company CEO meeting on May 11, 2001. The attendees analyzed in earnest the current CTV and Tube market they are currently facing and reached common understanding on various aspects such as oversupply being much greater than demand, drastic price plunge of CTV SET[S], while the price of main materials like GLASS, etc continues to remain high, and the unreasonably high import duty for large and x-large glass material. The entire industry is facing a deficit in 1Q of 2001.

During the meeting, the attendees studied the 2000 <843> official announcement from the minister of industry again in earnest, and after a sufficient review, they decided at the meeting that the entire industry should cut production from the beginning of May 2001 to reduce inventories (except for export model production). GLASS purchasing price shall be implemented as per the agreement at the meeting.

Representative Signatures of the Meeting Participants:

IRICO Group	: Gyu Doh (Secretary)
Nanjing Philips	: Soo Hwa Lee (General Manager)
BMCC	: Shin Chung Liang (Vice president)
Samsung SDI	: Kwan Tae Choi (Executive Director)
Guangdong CPT	: Choon Gyu Ha (Vice president)
LG Changsha	: Ah Pyung Yang (General Manager)
SEG-HITACHI	: Gook Gyun Yang (Executive Manager)
Shanghai Yongxin	: Hong Yuh Jang (Vice President)

May 11, 2001

The background for writing the above meeting bulletin is taking the current circumstance with the burden of excessive inventory into consideration, to lower glass prices and to stop price decreases by officially notifying, and adding some impact by using the industry name, the SET Makers and the GLASS Makers of the LINE STOP being implemented by each company.

- End -

EXHIBIT L



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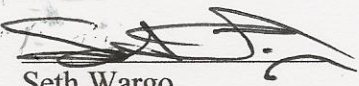
STATE of NEW YORK)
)
COUNTY of NEW YORK)

SS:

CERTIFICATE OF ACCURACY

This is to certify that the attached document, "*SDCRT-0087700 - SDCRT-0087702*", originally written in *Korean* is, to the best of our knowledge and belief, a true, accurate, and complete translation into *English*.

Dated: June 12, 2013


Seth Wargo
Consortra Translations

Sworn to and signed before ME this
12th day of June,
2013.


Notary Public

JAMES G MAMERA
Notary Public, State of New York
No. 01MA6157195
Qualified in New York County
Commission Expires Dec. 4, 2014

Industry Managerial-Level Meeting Proceedings

Time and Location: China, Guangdong Province, Shenzhen City, She kou, South Sea Restaurant, Conference Room
August 9, 2001 08:30 – 16:30

Participants:

SEG – Hitach: Sun Shengdian (Director of Board and General Manager), Yang Guojun (Assistant General Manager and Industry Association Secretary)
BMCC: Fan Wenqiang (Vice President), Lee Dae Rim (General Manager)
Irico: Ma Jinqun (General Manager), Yui Gun Seol (Manager), Shin Hyo- Rim (Manager)
Guangdong CPT: Zhan Zongqing (General Manager), Song Fan (Vice President), Wu Weixian (Department Manager)
Shanghai Yongxing: Zhou Jiachun (General Manager), Zhu Danlin (General Manager)
Nanjing Philips: Yoo Jong Song (General Manager), Li Xiuhua [Su Hwa] (Manager)
Changsa LG: Kim Chang-Ki (Vice President) and three others
SDI: Ha Hoo-Mok (VP), Maeng Joo Ryong (General Manager), Wang Linfeng (Manager)

Results:

- Production Reducation

Proposal A): From August 1, each company reduces production by 25% compared to the total production volume last year (based on the industry exchange data). Each company limits the maximum production volume for three major models (21", 25", 29").

Formula: Total production of Y2000 x 0.75(%) ÷ 12 (months) X 5 (months)

Proposal B): For fairness of the competition, on the assumption of 25% production reduction in the second half of the year, the maximum production volume that each company can produce is reduced by the inventory volume of the major three models as of July 31.

Formula: Total production of Yr.2000 X 0.75(%) / 12 (months) X 5 (months) – inventory as of late July 2001

01000258

- Suggested Price

21" MS RMB 430

25" MS RMB 635

29" SF RMB 930

* The above price is based on a six-month promissory note. In the case of a cash payment, the prevailing interest rate will be deducted. Each company must follow the above pricing and must not sell at a lower price through any unfair competition means.

Each company will sign the written agreement, guaranteed by general managers' personality and credibility. Any company that violates the agreement will face disciplinary actions by the Association.

If a company violates the agreement, the Association will issue a warning and send a written notification letter to the company so that the company can have an opportunity to correct the violation. When the company ignores such warning, the parties will hold a meeting to suggest the penalty and the penalty measures voted at the meeting will be thoroughly executed.

Furthermore, a 'HOT-LINE' will be set up among the general managers so that the violation can be reported to the Chair and the Secretaries of the Association

To carry out the 25% reduction of production, the Association will form an inspection team which includes one person from each company with the chair taking the lead. The TEAM drafts the reduction implementation measures and notifies the general managers of each company.

Once the meeting proposal is passed, and the price previously agreed between each supplier and CTV company is lower than this price proposal, the unshipped supplies must be provided at the newly agreed price, and if it gets continuously executed at the previous price, it will be considered a violation of the agreement. Above proposal shall take effect two days after being signed.

01000259

The general manager of each company shall review proposals A and B and notify the Secretary of the Association in writing within two days.

Attachment: Proposal Table

Company	Proposal A	Proposal B	Signature of General Manager
BMCC			
Nanjing Philips			
Irico			
Shanghai Yongxin			
LG Changsha			
SEC-Hitachi			
Samsung SDI			
Guangdong CPT			

- Notes)
1. Each company, please mark ✓ in the proposal that you agree with and sign.
 2. Please submit the signed form to the Secretary of the Association, Guk Gyun Yang.
Fax: 0755-3355850

01000260

업계 총경리 회의 기요

■日時 및 場所 : 中國 廣東省 深천시 蛇口 南海大酒店 會議室
2001年 8月9日 08:30~16:30

■參席者 :

SEG-HITACHI : 孫盛典 董事長 겸 總經理
楊國鈞 助理總經理(겸 業界協會 秘書長)
BMCC : 范文强 副總經理, 이대림 부장
彩虹 : 馬金泉 總經理, 위건설 경리, 신호림 경리
광동CPT : 詹宗慶 總經理, 宋帆 副總經理, 伍緯憲 部長
상해영신 : 周家春 總經理 朱丹林 經理
남경PHILIPS : 宋耀宗 總經理 李修華 經理
장사LG : 金昌起 副總經理 외3명
SDI : 河侯穆 常務, 孟柱龍 部長, 王林峰 課長

■ 結果 :

■ 減産

A) 안 : 8월 1일부터 각 업체는 작년 총생산량(업계교환자료 기준)기준
25% 감산 실시. 각 업체의 21" 25" 29" 3가지 주요기종의
최대 생산량을 限定 한다.
算式: $2000\text{년 총생산량} \times 0.75(\%) \div 12(\text{월}) \times 5(\text{월})$

B) 안 : 경쟁의 형평성을 감안 하반기 감산 25%의 전제하에서 7월31일
까지 3가지 주요기종 재고를 공제한 물량을 각 업체 최대한
생산할수 있는 물량으로 한다.
算式: $2000\text{년 총생산량} \times 0.75(\%) \div 12(\text{월}) \times 5(\text{월}) - 2001\text{년}$
7월말 재고

01000258

■ 價格案

21" MS RMB 430

25" MS RMB 635

29" SF RMB 930

- * 상기 가격은 6개월 어음기준이며 현금 집행시 현행 이자율 공제.
각 업체는 상기 가격을 반드시 지켜야 하며 그 어떠한 부당한 경쟁수단으로 低價 판매하여서도 안된다.

서면 합의를 서약하여 총경리의 人格과 信用을 擔保로 하며
위배될 경우 협회의 懲戒를 감수한다.

위배한 기업에 대해 협회는 경고와 서면 통보를 하여
개정하도록 하며 경고 무효시 업계총경리 회의를 개최하여
징계조치를 제의하며 총경리 회의에서 의결된 조치는 철저히
집행한다.

또한 총경리간 HOT-LINE을 개설하며 협회 회장 및 비서장에게
위배 사실을 수시 통보할수 있도록 한다.

하반기 25% 감산조치를 실시키 위해 협회는 회장을 필두로
각 업체 1명씩 파견한 요원 중심으로 감산 감시TEAM을
구성, 감산실시방안 작성 및 각업체 총경리에게 통보한다.

회의 제안이 통과될경우 각 업체와 CTV 업체간에 기 체결한
가격이 금번 價格案 보다 낮을 경우, 미출하분은 반드시
새로운 가격로 하여야 하며 지속적으로 기존가격대로 집행시
협의 위배로 간주한다. 상기 제안은 본결의 서명후 2일부터
유효하다.

01000259

감산 A,B 안에 대하여 각 업체 총경리께서는 확인하시고
2일간내 서면으로 협회 비서장한테 통보하여야 한다.

별첨 : 제안 표

협회업체명	A안	B안	총경리서명
BMCC			
남경PHILIPS			
채흥			
상해영신			
장사LG			
SEG-HITACHI			
삼성SDI			
광동CPT			

- 주) 1. 각 업체는 동의하는 안에 √ 표를 하시고 서명해 주시기 바랍니다.
2. 서명한 상기표를 협회 양국균 비서장한테 발송 해 주시기 바랍니다. FAX: 0755-3355850

01000260

EXHIBIT M



June 29, 2012

Certification

Park IP Translations

This is to certify that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese into English of the document with bates number: CHU00030067E.

A handwritten signature in dark ink, reading 'Abraham I. Holczer', is positioned above a horizontal line.

Abraham I. Holczer

Project Manager

[TRANSLATION]**Contact Report**

[Handwritten:] Submitted to Vice President Chung [Handwritten:] faxed 3/1

Date: December 31, 2003 in Shenzhen, China

Companies Visited: *Irigo* Export Sales Chief *Ms. Yuan Liang*

Content:

1. *Irigo* production line and its production capacity:

Total production capacity has reached 14M in 2004, and more than 15M in 2005, breakdown as follows:

Line	#A	#B	#C	#D	#E	#F	#G	*#H
Size	21FS	21FS	25FS	25PF/29PF	14"	15PF/14"	21PF	21FS
Capa/Year	2.0M	1.8~2M	1.7M	2.0M	14":3.7M//15"PF:0.4M		1.8M	1.8M

Remark: *#H line is one of the two old Hitachi lines newly purchased. One line is expected to start mass production in August 2004 (production capacity 1.8M/year). Approximately 700k of 21FS (thick tube neck) will be produced in 2004 (Note: Presently, *Irigo's* 21FS is thin tube neck). The other line scheduled to be utilized at the end of 2004 is now *Delay* for the schedule is unclear.

2. Description of *Irigo* production & sales:

Actual sales in 2003 almost reached 10.7M, sorted by size as below:							
14"	15"PF	21"FS	21"PF	25"FS	25"PF	29"PF	Total
3,600k	100k+	3,800k	900k+	1,500k	600k	200k	10,700k

Remark: 1) In 2004, the production of small & medium sizes is basically planned in accordance with production capacity. 21"FS production may increase, depending on #H line's output. There will not be a plan to significantly increase volume and sales in 2004 due to the losses sustained by the 25"/29"PF.

2) The export plan for 2004 is approximately 14"× 230k/m (approximately 2.7M, constituting 72% of total production capacity), and approximately 690,000 for 21" (Q1×30k/m, Q2×50k/m, Q3×70k/m, and Q4×80k/m, related to the #H's plan of starting mass production in August).

English words found in the original text are *italicized*.

Translator's remarks are indicated in brackets [].

3. Irico said that its profit would exceed RMB 400 million this year. However, 14"/21" would mainly contribute to its profit, instead of 25"/29", meaning *usd*1.0 profit (equipment depreciation already amortized fully) would be made when 14" is sold at *usd*16.0. Apparently, 14" contributed most to the profit. On the other hand, the cost of 21"FS would reach around *usd*31.0~32.0 (without depreciation), which Irico believes will give itself a strong competitive edge.

4. As to the 14" quotation, Irico said, it had noticed that *Thai-CRT* quoted *usd*19.0 to Changhong in July and had, therefore, supplied 14" to Changhong at low prices under its executive's instructions. Later on, Irico signed a contract with *Vestel* in August to supply 14" at *usd*20.0. We believe that Changhong was most likely not telling the truth when it mentioned \$19 because *Thai-CRT* was selling 14" very well and the supply in Southeast Asia was tight in the second half of the year. In Southeast Asia, the selling price had already exceeded \$20. Therefore, they would not have *Offer* \$19 to Changhong. Furthermore, customers in China/Turkey, etc. all said that CPT price quotes are too high and, presently, the price in the Southeast is approximately *usd*21.0. We do hope that while the 14" is making a strong showing of higher profits, Irico, can cultivate an active role in maintaining the market price (Irico is the most aggressive and belligerent and, therefore, the most qualified to stop the price war).

With regards to 21"FS, Irico indicated that it focuses on domestic sales. Due to smaller export volumes, export sales prices were pretty good. However, the price level of *LG/Fuzhou* and *Shenzhen SEG-Hitachi Color Display Devices Co* (which mainly focuses on export), *Shanghai Evernew*, etc. should be lower. For example, *Shenzhen SEG-Hitachi's* December price was *usd*38.5. We indicated that customers in China mainly use domestic sales-related conditions, such as a 6 month postdated bank draft, factory delivery, etc., to request a much lower price in order to offset related expenses. Thus, it is very difficult for *Chunghwa Picture Tube* to make a decision on the final price quote. The current range within about *usd*38.5 to a little more than 39.0 should be considered reasonable and will not destroy the market. (Note: Our actual price we quote to our major customers in China is between *usd*38.0~39.0, except for the pricing we give to Changhong in Szechuan, which is *usd*37.50).

5. Irico believes that the export-oriented *SEG Hitachi*, *Shanghai Evernew*, and Irico should be affected the most by the Chinese export tariff refund. Irico estimated that its costs increased by 2% (when materials costs/labor costs and other expenses are deducted) and the increased color tube price is not sufficient to *Cover* the increased costs. It is difficult to predict whether the increased costs can be absorbed by the upstream materials. Seeing the way upstream material costs are currently on the rise, it is very possible that the color tube factories will be forced to absorb the increased costs themselves.

6. In 2004, *Irico Glass* will expand by adding 2 *Tanks*, primarily for producing 21" *Panel* and a small quantity of 25"/29" *Panel*. Its main goal is to increase its internal supply, improve its competitive edge, and replace *Anyang* for the supply of 21"FS *panel*.

English words found in the original text are *italicized*.

Translator's remarks are indicated in brackets [].

7. In the near future, both parties wish to once more exchange views regarding *CPT* factory production capacities, glass supply/demand, and the 2*Q* market situation in China and Southeast Asia.

- End of Report -

Submitted for approval!

[Handwritten note:] 14” *CPTM*’s cost is estimated at 16.4 (excluding depreciation, and including patent royalty). More efforts will be needed.

[Signed by:] Jia-Fang (Jeff) Yue 3/1

[Submitted by:] Employee Shih-Ming (Maxim) Chen
January 2, 2003

[Submitted to:] President Jia-Fang (Jeff) Yue
HQ Assistant Vice President Yang / Assistant Vice President Cheng
Vice President

English words found in the original text are *italicized*.
Translator’s remarks are indicated in brackets [].

接洽報告

日期：2003年12月31日於中國深圳

對象：Irico(彩虹)出口營銷部長 Ms.梁媛

內容：

1. 彩虹生產線及其產能：

04年總產能約達14M，05年則達15M以上，如下：

生產線	#A	#B	#C	#D	#E	#F	#G	*#H
尺寸	21FS	21FS	25FS	25PF/29PF	14"	15PF/14"	21PF	21FS
產能/年	2.0M	1.8~2M	1.7M	2.0M	14":3.7M//15"PF:0.4M	1.8M	1.8M	1.8M

Remark: *#H線係新購2條日立舊線之一，其中一線預計04年8月起量產(產能1.8M/年)，

04年約可產出21FS(粗管頸)約700k左右(註：彩虹現有之21FS為細管頸)，另一線原預定2004年底嫁動，現有Delay，時程未明確。

2. 彩虹產銷概況：

03年銷售實績約達10.7M各尺寸如下：

14"	15"PF	21"FS	21"PF	25"FS	25"PF	29"PF	Total
3,600k	100k+	3,800k	900k+	1,500k	600k	200k	10,700k

Remark: 1) 2004年在中小尺寸方面基本上依產能規劃，21"FS可增量視#H線產出而定。而25"/29"PF因屬虧損尺寸故04年暫無大幅增量銷售之規劃。

2) 2004年外銷計劃約為14"x230k/m(約2.7M，佔總產能之72%)；21"則約為69萬(Q1x30k/m、Q2x50k/m、Q3x70k/m、Q4x80k/m，與#H計劃8月起量產相關)。

3. 彩虹稱今年利潤約超過人民幣4億元，但利潤並非來自25"/29"，主要來自14"/21"，表示依其廠內估算14"在售價usd16.0時仍有usd1.0的利潤(設備折舊已攤完)，對利潤的貢獻最大，而21"FS成本則可做到約usd31.0~32.0左右(未含折舊)，亦自認有相當的競爭實力。

4. 在14"報價方面，彩虹稱在7月時看到Thai-CRT對長虹報價為usd19.0，故依其上級指示以低價供應長虹，其後並於8月以usd20.0與Vestel簽下交易合同。我方表示長虹所稱之\$19應造假成份居多，因Thai-CRT之14"產銷狀況不錯，後半年在東南亞供應緊，在東南亞都賣\$20以上，應不會對長虹Offer \$19。而中國/土耳其等客戶都說華映報價太高，且目前東南亞價格約在usd21.0上下的水準，希彩虹能在14"仍有較高利潤的實力支持下，發揮維護市場價格的角色(彩虹戰力最強故最有資格止戰)。

而在21"FS方面，彩虹表示其以內銷為主，外銷價因量少故也可有不錯的售價，但LG/福地及以外銷為主的賽格日立、上海永新等的報價水準應較低，例如賽格日立12月價格為usd38.5。我方表示中國客戶都以內銷的相關條件，如6個月承兌匯票及到廠交貨等，要求給與更低價格以轉嫁相關費用，故華映在報價上非常難以拿捏，但以現在約usd38.5~39.點多應屬合理，不會造成市場的破壞。(註：我方對中國客戶實際報價除地處四川的長虹為usd37.50，主要客戶約在usd38.0~39.0之間)。

5. 就中國外銷退稅問題，彩虹認為受影響較大的應屬以外銷為主的賽格日立、上海永新及彩虹本身，彩虹估算其本身成本約增加2%(扣除外購材/人工成本及費用比重)，但認為難以彩管漲價來Cover，至於是否可往上游材料推則難以論斷，以現在上游材料減漲的態勢來看，很可能彩管廠不得自行吸收。

6. 彩虹Glass將在04年擴增2個Tanks，主要生產21"Panel及少量25"/29"Panel，主要目的在增加內部供應提高競爭力及取代安陽21"FS panel的供應。

7. 雙方希近期再就中國及東南亞地區CPT廠產能、玻殼供需及2Q市況交換意見。

以上報告

呈核！

14" CPTM 的估算成本為16.4 (不含折舊, 含專利金), 故向還要再努力。

敬啟

梁媛經理

收 楊協理/鄭協理

副總經理

陳時銘 3/1

職陳時銘

2003年1月2日

EXHIBIT N



June 20, 2012

Certification

Park IP Translations

This is to certify that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese into English of the document with bates numbers range:
CHU00123358E - CHU00123361.

A handwritten signature in cursive script, reading 'Abraham I. Holczer'. The signature is written in dark ink and is positioned above a horizontal line.

Abraham I. Holczer

Project Manager

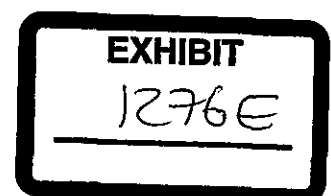
Park

Case

#

29567

134 W. 29th Street 5th Floor • New York, N.Y. 10001
Phone: 212-581-8870 • Fax: 212-581-5577



[TRANSLATION]

Overseas Trip Report

March 21, 2004

Trip Period: 2004.03.15 – 18
Trip Destination: Singapore
Trip Taken By: Sales Sheng-Jen (S.J.) Yang
Trip Mission: Participation in visiting <i>GSM/Thomson</i> and <i>LG</i> , review of supply quantity and price hike
Job Description: Details in attached contact report

Comments and Conclusion:

1. Various *CRT* factories in Southeast Asia all were facing problems of price hikes in materials and the shortage of glass. 14" was the hottest among the demand situation. 20"/21" were more stable.
2. For the price hike, the targets remained to raise \$1 for the 14" and to explore individual cases for the 20"/21" *FS*. *CPT* and *Thai-CRT* were the most active among the various makers. They have completed most parts of the price hike. Comparatively speaking, *SDI*, *LPD* and *MTPD* almost all were taking a wait and see attitude after the decision was made in mid-February. It was not until mid-March that they began to take action. If they wished to complete by the end of March and to start the price hike in April, it might be difficult, especially for *Sharp*. *CPT* especially explained that *Fumai* has already accepted to raise price in April and it even asked to increase the quantity. Various makers should no longer be worried and should go quickly to negotiation.
3. *LG(TV)* strongly resisted the raising of price for 14". Finally they only agreed to raise *B+D* by \$0.5, far from \$21.6 (for Korea *ITC 2-4kM* requested to remain original price of \$21.3). Although this price was similar to the customers in Mainland China supplied by *CPT*, *CPT* still requested *LG* to accept a \$1 price hike. Both sides continued to review the replies.
4. *Thomson* price was transparent as it was going to merge with *TCL*. Also, the current price of 14" was slightly high. Both sides agreed to raise the price of 14" in April: \$0.90(\$21.0→\$21.9), 20": \$0.60(\$35.5→\$36.1). At the same time, there was also a simultaneous development review of *Thomson* Poland's 20"/21" *FS*/21" *RF*/29" *RF*. This new business opportunity would be helpful to *CPT* in diversifying its market.

Drafted by:

English words found in the original text are italicized.
Translator's remarks are indicated in brackets [].

CONFIDENTIAL – GRAND JURY MATERIAL

CHU00123358E
Translation

Interviews and Instructions by Department Supervisors:					
President	Vice President	Assistant Vice President / Plant Manager	Director / Vice Plant Manager	Manager	Group Leader / Assistant Manager

1. Supervisors Approving the Trips at a glance:

Level of People Requesting to Go Abroad	Approving Power
Department First Level Supervisor	Approved by President
Other Supervisors and Colleagues	Approved by President

2. The process for this list: People Requesting to Go Abroad → Department Supervisors in Charge → Submitted by Human Resources Department.

3. Price Negotiation: LPD/TSB/SDI inform very late

	<i>MTPD</i>	<i>SDI</i>	<i>LPD</i>	<i>T-CRT</i>	<i>CPT</i>
<i>Sharp</i>	<i>will reply</i>	<i>send letter</i>	<i>---</i>	<i>---</i>	<i>inform Feb.24</i>
	<i>By 3/E To HQ</i>				
<i>World</i>	<i>R:\$21</i>		<i>14" same as CPT'</i>		<i>14": May \$1 -> OK</i>
	<i>R:30k/M</i>		<i>20"/ 21" Nego</i>	<i>from Apr. Nego.</i>	
<i>Funai</i>	<i>under nego</i>	<i>Send letter</i>	<i>20"+1 Apr</i>		<i>14": \$1 → OK</i>
	<i>By 3/4</i>	<i>This week</i>			
<i>Thomson</i>	<i>Nego</i>		<i>14"+1 → OK</i>		<i>14": \$1 → OK</i>
	<i>20" Nego</i>				
<i>Sanyo</i>			<i>---</i>		
<i>JVC</i>	<i>3/17</i>	<i>this week</i>	<i>Nego</i>		<i>20" only</i>
	<i>Nego</i>	<i>Discuss</i>		<i>still Nego</i>	
<i>Vestel</i>	<i>21.5->24 (+2.5)</i>		<i>+2</i>		<i>ask:\$1.5</i>
	<i>20K→10K</i>	<i>Nego</i>		<i>no response</i>	

SDIM switch 14" 50K to 15" CDT, if CDT go down 14" will increase again.
SDI to TCL 14" \$23-\$24

English words found in the original text are italicized.
 Translator's remarks are indicated in brackets [].

CONFIDENTIAL – GRAND JURY MATERIAL

CHU00123359E
 Translation

TSB say BMCC to China \$25?

4. China Market

*TCL: LPD 21"FS 70k → half drop
TMPD 29"RF Apr. 30k → 0, use Thomson Tube*

LPD: 21" price decrease a little like RMB \$5, but 25" drop a lot

SDI: from May, Jun demand decrease, 21" price same as LPD

5. SDI discuss with custom too late, mostly forecast to get the result by end of mar. this will be too to start price increase from Apr.

*6. Sharp: New price target start from Apr., but the dead line is May.
World: CPT and Thai-CRT keep discuss with Orion to start from Apr.
Funai: Should finish discussion by end of Mar.
Thomson: SDI should finish until 20th of Mar.
Sanyo: Should finish by end of Mar.
JVC: T-CRT by 23 or 24 of Mar., SDI discuss 17, Mar.*

*English words found in the original text are italicized.
Translator's remarks are indicated in brackets [].*

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CHU00123360E
Translation

Comments and Conclusion:

1. Color TV/color tube makers in Mainland China generally said that there would not be glass shortage in the first half of the year (would only be a little tight). But in the second half of the year, quite a number of furnaces would start and supply would be more than demand.
2. The internal sale of Color TV market in Mainland China has already slowed down after the Spring Festival. As for external sale, the demand for 14"/21" was not bad, but 25" (inclusive) and above was affected by USA's anti-dumping policy and sales to USA were almost zero. And, there was also no bright performance in other regions. Under such influence, with the exception of 14"/21", demand in Mainland China for all other color tubes was not strong. Color tube makers' inventories continued to increase. Furthermore, April – June is usually the lowest season in Mainland China, and is the season when the prices of color tubes drop the most. The general response from the color tube makers was that, for 21" (inclusive) and above, it would be fairly good if they could *Keep* price in Q2, especially there were already rumors that some makers have started to cut price to vie for orders.
3. Most Mainland China customers understood the situation of the 14" and agreed to CPT's price hike, but it was still difficult to negotiate the range of increase. And, all did not agree to CPT's request to raise the price for 21" during a low season in Mainland China. They would only accept a very small adjustment. The initial conclusion of various makers' price hike found in this visitation trip is as follows:

	14"	21"	Remark
IRICO	\$ 1.1	\$ 0.2	OK
TCL	\$ 1.0	\$ 0.3	OK
Konka	\$ 0.75	-	CPT continue to request at least \$1.1 for 14" and \$0.3 for 21"; continue to review
Skyworth	\$ 0.5	-	CPT continue to request at least \$1.0 for 14" and \$0.3 for 21"; continue to review
Tedalex	\$ 1.1	\$ 0.7	Africa customer, IPO in Hong Kong, 3/8 mail CFM to accept price hike

Although Konka/Skyworth have replied but there are still differences with CPT's request. They will have internal review again and will apply in the week of 3/8.

4. *Orion* only peremptorily asked CPT to provide in quantity and did not respond to the review of price. In the end, they only said they would report the situation to their President Otake and would reply after a review. It seemed that the acceptable range of price hike would be very limited.
5. TCL/Skyworth/Konka all will have huge expansion plans for LCD TV. At present, the sizes of CPT's LCD that can match such development are limited (already reviewing 20"/30"). But they are interested in the sizes CPT has planned for the

English words found in the original text are *italicized*.
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future, especially CEO Zhao and Deputy CEO Yu of *TCL*. They personally asked about the situation.

Drafted by:

English words found in the original text are italicized.
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CERTIFICATE OF ACCURACY

This is to certify that applicable sections of the attached document, "SDCRT-0091524 – SDCRT-0091530", originally written in *Korean* is, to the best of our knowledge and belief, a true, accurate, and complete translation into *English*.

Dated: July 20, 2012


Seth Wargo
Consortra Translations

Sworn to and signed before ME this
20th day of July,
2012.


Notary Public

JAMES G MAMERA
Notary Public, State of New York
No. 01MA6157195
Qualified in New York County
Commission Expires Dec. 4, 2014

Toshiba(DD) 타카모토과의 통화내용

작성자 : 김석연 (2008년 7월 4일 목요일 오전 10:44:34)

연락처 : 전용수 사원/보안문관/마케팅팀/상업SDR (2008년 1월 8일 화요일 오전 11:00:16)

안녕하세요.

Toshiba(DD) 타카모토과의 통화내용을 간략하게 보고드립니다.

1) 29HP 물량 (원래군 1K → 7월 3K) 에 대한 감사

2) 3Q 제시가격의 타사와의 비교

를 위해 공책을 했습니다.

1) 29HP 증량의 건은,

오래된 사업관리 계획 소문이 있어서 그 물량이 SDR에 전환된 것이라고 합니다.

현재 3K keeping, 8월 2.5K forecast가 있으나 이 물량을 유지하기 위해서는

현재 가격인 \$68원에서 \$1.3 인허가 필요하다고 합니다.

→ 지금까지 SDR/Orient의 2사구역을 해왔는데, Orient의 상황 및 단결행사의 접근 가능성등을 파악하여 대응해야 할 것 같습니다.

2) 3Q 제시가격의 타사와의 비교

가격의 6월말 3Q 가격 미팅을 한후, 오리온/MTFD와의 가격미팅 일정이 있어 확인을 하였습니다.

MTFD의 경우 금주의 가격을 제시하기로 하였다고 합니다.

구체적인 가격은 못 들었지만,

21P는 AK보 \$ 37 제시한 SDR가 현재 1위.

29P는 타사에 뒤져있음.

현재물량(29F 5K, 29HP 3K)을 지키기 위해서는 \$1.3 씩 인허가 필요하다고 합니다.

05000666

또한, TTF에서의 7월 초 혹은 중순경의 미팅을 (강력하게) 요청을 받았습니.

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In re Cathode Ray Tube (CRT) Antitrust Litigation

SDCRT-0091027

Competitor China Visit Report

- ☐ Meeting Date : 8/16/2005 ~ 8/17
- ☐ Consulting Competitor : Irico, Shanghai Young –Shin
- ☐ Business trip participants:
 - Headquarters: Vice President Jae Shik Kim, Manager Chang Hwan Lee
 - Local in China: Executive Director Hoo Mok Ha, Corporate Head Se Won Lee, Woon Sa Manager (Irico), Do Goh Manger (Shanghai Young-Shin)

August 18, 2005

05001163

Summary

■ Forecasted Market

- ☐ Main reasons for the slump in the first half of the year
 - Oversupply and excess inventory
 - Attack by FPD: Because of a sudden price drop in the short term, consumers believed that if they waited more, the price would drop additionally so consumers actual delayed their purchasing decisions in the first half of the year
 - The price bid by Changhong: It caused a sudden price drop because the bid price was disclosed to the market
 - Regional demand exceeded regional CAPA: It was a structural issue for the Chinese CPT industry as well in the first half of the year

☐ Forecast for second half of the year

- Normal recovery of consumer sentiment: FPD price drop is returning to normal so consumer sentiment should be stabilized.
- No additional price drop by CPT: It has been determined that the entire industry has reached its margin cost, so it is expected that any additional price drop would be difficult
- The seasonal on-season will return

■ Evaluation of the purchasing policy in Changhong

- They have participated in the bid because of internal issues (such as inventory, line operation), but an internal evaluation has determined that it has adversely impacted profit
- If there is an agreement in the opinion of the industry, a co-response would be possible, but expect that an adjustment of each company's interest would not be easy

■ Opinion for industry cooperation

It is ideal to compose a Coalition has binding power to enforce decisions

Irico Meeting Report

- Date : August 16 (Tuesday), 2005 13:00 – 15:40
- Attendees: Irico: General Manager: (Xing Daoqin), Vice General Manager (Guo Mengquan), Vice General Manager (Zhang Shaowen) , Secretary of General Manager (Chen Xiaoning)
SDI : Vice President Jae Shik Kim, Executive Director Hoo Mok Ha, Manager Chang Hwan Lee, Manager Woon Sa

■ Meeting minutes

(Exchanged greetings)

General Manager (Xing): I had an opportunity to visit the Shenzhen factory in 1997 and also the Korea HQ in 1998 as part of a technology exchange program so I've learned a lot about factory management and overall operation. I was very impressed with the SDI company culture and employee activity.

VP Kim: I visited Irico for the first time, and it was my hope that the similar companies would have a closer relationship with each other. Right now it's getting tougher to intimidate LCD. I think that a cooperative partnership is urgently needed to respond effectively to the LCD challenge with competition in good faith between companies that are in the same industry.

For LCD, the monitor division reached 50% in the last year, but this year is should reach 65% with MS. We have focused on the TV area since the second half of the last year. This influence is very dependent on the market, but it is rapidly being invaded by CPT now. It is more serious in the advanced counties. We expect that the LCD market share is 23% in the US market, and that it will be up to 28% in the European market. We expect that CRT TV demand will decrease by more than 20,000,000 units (compared to last year), while the consistent price drop strategy of LCD will have an adverse on CRT TV demand.

The CRT TV market is decreasing in advanced countries due to the influence of FPD and the exchange rate, but I would like to hear from General Manager (Xing) why the China market has collapsed in the first half of the year.

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General Manager: (Xing): The China market has also been influenced by FPD as you mentioned. The continuing price drop of FPD products has an especially adverse influence on CRT TV consumer sentiment.

It is possible to divide the recent history of the Chinese CRT industry into 2 steps. Step 1 was from 1999 to 2001, the CRT industry had the entire market at the time. Step 2 was from 2001 to the present, when the CRT industry has been losing its driving force, so this step is a time when cooperation is needed. We expect that the demand for CRT (China market) will decrease and that the price will continue to drop, too. When we look at the performance for the first half of this year, FPD has already exceeded CRT in terms of price.

Whenever competition gets fierce, it highly requires cooperation between the same businesses in the industry and between products. I tried to hold a meeting several times this year with the industry, but I wasn't able to do it. I think we need to have an industry meeting to expand activity to develop industry standards such as supply and demand and for a product and quality guide.

Also we urgently need to make "adjustments" in terms of supply and demand. Currently China Capa exceeds demand. It is clear that the development of FPD is continuously invading CRT demand, so this contradiction must be solved quickly. Especially, we need to control the supply and demand in China considering that it is the center of CRT production and there needs to be more study of the situation specifically in China. If FPD development has occurred at this speed, I think that the remaining required CRT demand would decline and then have a period of stability.

VP Kim: We are attempting to cooperate closely with CDT. We have prevented a price decline of around the 12% level even though LCD has been attacking us this year. There has been cooperation within the CDT industry through an

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an active adjustment of supply depending on changes in demand based on an exchange of information between the actual workers. Also we have held TOP MEETINGS 1 - 2 times a year.

General Mgr. (Xing): Sharing information between the companies in China is a very necessary activity. In particular, an improvement in our ability to forecast would be the quickest way to improve the issue. Inventory has increased due to erroneous market forecasts, and this has had an immediate effect on product price. Also the response to the bid at Changhong has had a negative influence on the market.

VP Kim : I think it's the bidding method that is wrong rather than the bid itself. The problem is that when the bid price gets disclosed to the other party in the course of the bidding process, the disclosed price then gets spread throughout the market which leads to a rapid price drop. If we have a meeting between the companies during the first half of the year, we should try to reduce the speed of the price drops.

For the second half of the year when we will be coming to the peak season, I would like to hear your opinion on how to stabilize the market, and how to operate during the off-season next year. In addition I would like to consider together how to respond to the LCD market invasion.

If I could make a suggestion, I think this kind of cooperation should be a comprehensive, collaborative solution rather than a single solution. For example, I think that at Irico, a reduction in the run-rate will have a direct impact on the GLASS factory or DY, and on other parts used by Irico, SDI also needs to consider the parts together.

Vice General Mgr.Kwak: First I would like to talk about the market in the first half of the year, the biggest reason for confusion over the first half this year is the reality of "oversupply." Given this reality, I think that the FPD attack, especially their marketing strategy has the effect of freezing CTV consumer sentiment, and continuing price drops in the short term implies to the consumer that they should wait a bit and the prices will be even cheaper, so TV sales have actually decreased since February.

- 5 -

Another thing is the bid by Changhong. In the former days, Changhong's target purchase price would go through several rounds of negotiations but now it is done within several hours. I still think that the main reason for the market turmoil is excess inventory and the current CPT CAPA in China that exceeds actual demand.

But there are several positive factors in the second half of the year. First, consumer sentiment seems to back to normal. Consumers feel that the FPD price drop won't reach the level of the consumer predictions and also CPT seems to have reached a limit price that cannot drop any further. Also, signs of the peak buying season are showing in the market.

However, CPT CAPA still exceeds demand by a lot in the China region, this issue must be continuously focused on.

General Manager (Xing): In order to have a wholesome development of the market, I think it is important to solve the following 3 issues.

First, there must be an improvement in forecasting ability. No one expected that it would be worse this year when the market was good last year and no one realized how much of an impact FPD would be.

Second, there needs to be a channel for negotiation between the distributor and CRT company. An advertisement showed a 42" PDP for RMB 6,999 in March of this year, but actually no product was available to be purchased at this price. There was also an ad for a 42" PDP at RMB 6000 in July of this year, but the product could not be bought. Furthermore, the stores took down the CRT TVs from their display section in January and February after the peak season and replaced them with FPD product at the front of the shops. I think the CRT companies need an efficient response system for this abnormal action by the distributors.

Third, we need to seek method to respond efficiently to the SET company. Before Changhong's bid decision, there is lot of opposition to it internally

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at Irico but there was no proper alternative plan to not to participated in there.

Executive Director Mr. Ha: SDI is very strict about managing inventory so if there is a decrease in market demand, it is immediately reduced.

General Mgr. (Xing): I agree with you. The present run rate at Iricos is about 70%. Even though we have had a LINE at rest for 2 months to manage inventory, in reality there is no coalition (actual activity) to form for bond of sympathy because of this. I plan to visit the current CRT industry chairman of BMCC, (Fan), on the 20th and get his opinion on all of this.

The operation of a proper coalition would be a very helpful activity for the country's economy as well as for the company, but the activity of the Chinese CRT coalition seems to be poorer than the TV industry. The agenda that is determined in the meeting seems not to be properly enforced. There is no binding tool for meeting results.

VP Kim: Due to the absence of a coalition between the companies, the CRT industry is facing a very difficult situation. Stored inventory has reached 500 million units. In contrast, SET has been constantly decreasing inventory so the current inventory for distribution has shrunk to about 500 million units from 800 million units earlier in the year. Therefore the quality of the CRT industry's coalition could be improved.

I would like to ask for a consensus of opinion about this situation in the BMCC meeting, and also I'm asking Irico to take leadership in getting cooperation in the industry considering that Irico holds a significantly powerful position in China. I believe that this kind of cooperation frame can be expanded to not only CRT but also to PDP and other industries.

- End-

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Shanghai Young-Shin Meeting Report

■ Date : August 17(Wednesday), 2005 10:00 – 13: 00

■ Attendees: Shanghai Young-Shin: General Manager (Sun Wei), Manager (Fan Wenyi), Myung Soo Cho (Interpreter)
SDI: VP Jae Shik Kim, Executive Hoo Mok Ha, Executive Director Se Won Lee, Manager Chang Hwan Lee, Manager Do Goh

■ Meeting minutes

(Exchanged greetings)

VP Kim: Analysis of the Sunjin Market has shown a lot of influence by LCD, the LCD market share in China is only 2% of the entire market so the actual invasion by LCD would appear to be very weak. But the 21C price has dropped by 38% this year, and 21F also has dropped by 25% so it does seem to be having an influence on the market. Therefore I would like to hear General Manager Sohn's opinion about this. And I would like to know what you think about cooperation in attacking LCE from within the same line of business.

General Manager Mr. Sohn: I've been president for only 2 weeks so I haven't had enough time to learn about everything yet, but I feel that all industries are facing difficult times. Especially, Shanghai Optoelectronics is currently experiencing more difficulty than what we expected. Both the objective and subjective factors are not good. We think that sharing and cooperation with other companies is very necessary. Even though it is difficult right now, I think there will be an improvement because of the gradual resumption of activity.

The first priority issue is oversupply. The failure to follow supply and demand has had terrible consequences. Second, the price has dropped rapidly. I think this has seriously hurt all businesses because the drop in material prices hasn't caught up to the speed of the CPT price drop.

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<p>VP Kim : You understand very accurately. I think that we need to share market information and move as an industry coalition to improve the situation.</p> <p>General Mgr. Sohn: We do need to have an industry coalition. I know we are seeking the opinion of each company about calling a meeting of General Industry managers at the end of August ~ early September.</p> <p>But, the current coalition organization is very weak. I think that we have failed to efficiently integrate each company's interests. Especially, I believe it is very unclear whether actions agreed to have been implemented. There is a conflict between the interests of each company and interest of common industry. For Shanghai Young-Shin, they could feel inferior compared to other companies, but there is room for improvement.</p> <p>Close communication is very important for the success of this activity, and a period of stability is desperately needed for survival, even short term.</p> <p>CRT and LCD are currently competing against each other. Samsung does both of them, so it's easy for them to say replace one with the other but they need to have a reasonable division of work but that could be another assignment. Of course, the foundation must be based on a premise of competency.</p> <p>VP Kim: Samsung group has 2 displays each, but the company situation is different. SDI is a CRT company; they are fiercely competing with LCD in the group. When we have not had LCD in the past, there is only competition within the industry, but with the emergence of LCD, we need to compete in good faith as well as cooperation in terms of companionship.</p> <p>With LCD, we expect the monitor area will grow by up to 65% this year from MS 50% last year. We think that this trend will continue but CDT has been cooperating very closely within the industry. LCD dropped 40 ~ 50% this year, but CDT only dropped 12 ~ 14 %.</p> <p>- 9 -</p>	<p>By sharing quarterly market information, it is possible to respond efficiently to the LCD attack.</p> <p>Also, the CRT TV market will not be able to prevent an LCD invasion, so expect CRT market demand to continuously decrease. Cooperation within the industry is critical and is a survival issue. If there is proper cooperation within the industry during the first half of the year, there should not be an inventory issue and we may prevent loss due to a price drop. Therefore cooperation is important even during the off-season next year.</p> <p>It's the same with the bid by Changhong. The price rapidly dropped due to the open bid price; 21 C type dropped by > 15% during the one time bid and because of this, a huge aftereffect remains in the market. This kind of rapid price drop will lead to co-destruction of the entire industry. SDI participated at the beginning, but did not participate in the second bid. Currently, only 3 companies are participating in the bid but the price drop is continuing.</p> <p>General Manager Sohn: Right now we are in the learning stage, so your thoughts may change. Shanghai Young-Shin has also observed this. I think that sharing of opinions is very important. If you were the president of Shanghai Young -Shin, how would you solve this situation?</p> <p>VP Kim: I think that inventory control is important. A response based on the market conditions is very important. If the market pie gets reduced, the industry must reduce Capa. Sharing within the industry to form of consensus is very important and we need to have an organized coalition to just survive.</p> <p>General Manager Sohn: When I hear your opinion, my actions might not have been wrong. The current run rate is not even 2 lines. But if we continue to not operate, it will be difficult for me to determine which way was correct by myself.</p> <p>- 10 -</p>
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VP Kim : The purpose of a company is to make a profit. It needs to adjust the price. But, in order to realize a common goal, each of us will need to yield. In this context, I am asking that Shanghai Young-Shin take a leading role during the industry meeting. For details the responsible people will negotiate with the actual workers.

General Manager Sohn: The current Shanghai Young-Shin inventory level is ranked #2 in the industry. If we don't solve these issues reasonably, we may constantly have problems and not survive.

Executive Director Ha: China is oversupplied. Right now we need to adjust production to prevent an oversupply during the off-season. We have to prevent an additional price drop. To this end, we must each sacrifice and yield to each other. Samsung was supplying 150,000 units per monthly to Changhong before the bid, but because of they did not participate in the bid, they are experiencing a lot of difficulty. If Samsung and LPD had participated in this bid, prices would have dropped even more. Even though only 3 companies participated in it, the price continues to drop. 21C dropped by 30 won in a one-time bid.

General Manager Sohn: Shanghai Young-Shin never officially promised not to participate in the bid, but in reality the outcome of the bid was not good. I think we need to discuss this. I think Shanghai Young-Shin is heavily yielding to others in terms of run rate.

VP Kim: Please don't misunderstand me. I am not visiting here because I want to tell you my story. I would like to talk about how to cooperate in response to LCD's influence or how to maintain the price or how to increase it because the demand in the second half of the year could increase, or how to respond to Changhong's bid. Also I would like to discuss how to support Shanghai Young-Shin's other parts companies based on a decreasing production.

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General Manager Sohn: We are agonizing over the Changhong bid. In reality, it is related to a survival issue so we have to look for balance, but there are no other alternative plans. It is very difficult to make the decision to stop a line continuously for more than 3 months internally.

VP Kim: I know that Irico has been agonizing over same issue too. But they said, if Shanghai Young-Shin participates in the bid, Irico can't avoid it. It looks like Irico may have a sense of rivalry against them. We need to find a reasonable approach to this. I hope that General Manager Sohn will take leadership and help in this area during the industry meetings. What is your forecast like for the second half of the year?

General Manager Sohn: I still not feel it in my heart. CRT should be relatively strong for TV, I feel that it wouldn't be as good the way it is.

VP Kim: Do you think the "Year of the Widow" could be one of reasons causing reduced demand in the first half of the year?

General Manager Sohn: I think the biggest reason is the real estate policy changes by the Chinese government and changes in the consumer sentiment of the middle class rather than that. Indoor living space is designed unfavorably for CRT TV since living space is getting smaller and room structures have changed. The problem is the distributor's domineering way. There is a discrepancy in the way negotiations create a disadvantage for the manufacturer, or the manufactures cannot decide their own fate. I think we should be able to gradually improve through industry cooperation.

VP Kim: We must take a deep look at LCD. The entire LCD demand last year was only 17M which is only 10% of the CRT demand of 170M, and China is 1.2M which is only a bit over 2% of the entire China demand. So it looks like we are too scared about this. In terms of the distributor, analysis of FPD sales says we might produce more to sell and also produce profit, but size of CRT is much bigger in terms of total profit.

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The difference in price between LCD TV and CRT TV is at least a bit more than 2 times, with an average of 3 to 4 times more. I think the problem is that we are reacting with too much sensitivity to the LCD price. We have reversed our thinking that we need to consider how to set up CRT prices and at what level.

Personally, I am suspicious that even if CRT prices drop, how much will the demand actually increase, but an effort to control supply needs to come first to reduce the difference of the price drop.

General Manager Sohn: I agree with your opinion, but if we do control it but there isn't any profit, I don't know if there is an alternative plan. I think that even though we are maintaining a reasonable price by reducing production, we may not be able to avoid a loss of operation based on the production reductions.

VP Kim: I think that we have to proceed with VE activity by downsizing. And I am asking Changhong to consider it as well as Irico. We are going to convince LPD or Thompson. I think that Irico and Young-Shin's role in this case is very important.

General Manager Sohn: I will review it in terms of minimizing the loss, and will consider what I can best do about it. And cooperation with SDI is more necessary in practical terms such as with patents.

VP Kim : I would suggest that there needs to be continuing cooperation with periodic meetings.

-End -

EXHIBIT P



June 20, 2012

Certification

Park IP Translations

This is to certify that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese into English of the document with bates numbers range:
CHU00102752E - CHU00102754.

A handwritten signature in dark ink, reading 'Abraham I. Holczer', is positioned above a horizontal line.

Abraham I. Holczer

Project Manager

[TRANSLATION]

Meeting Minutes of 2006 Color Tube Industry Presidents' Meeting

Meeting date: November 21, 2006

Meeting location: Shanghai, Huaxia Hotel

Attending companies and personnel:

BMCC:	Wenchiang Fan, Heng Zheng Guang Ze [Japanese name in Chinese phonetics], Dalin Li, Yongchun Chi, Liman Lu, Hai Huang
Xianyang Irico:	Xiaolin Shen
SEG Hitachi:	Guojun Yang, Jianmin Huang, Peng Guo
Changsha Shuguang:	Yaping Yang, Jing Feng
LPD:	Zaiguan Han, Yingyuan Lu, Jiangnan Ding
Nanjing Huafei:	Jianzhong Sheng, Dezhu Zhang, Minghui Xu
Novel:	Wei Sun, Lei Lee, Qing Ye
Samsung SDI:	Hoo Mok Ha, Chong Huan Lee, Yun Xie, Jing Wen [Korean names in Chinese phonetics].
Thomson:	Dade Han, Peng Xin
Xin Jun:	Xiangjie Hang, Zhiwei Wang

Main content:

Chief Secretary Yang chaired the meeting and begun with opening speech.

Chief Fan spoke: This Presidents' meeting is a key meeting; each of us are here to discuss and study about next year's market trend, strive for stability of the environment and seeking a industry of healthy development.

Agenda I: Information collector reported the current color TV and color tube industry condition and forecast of the future market (Details refer to *PPT*).

Chief Secretary Yang: As for the market reports from the information collectors, the following comments were mentioned: In future market reports, impact analysis on *CRT* to color television in flat color television market should be included: In 2007, the *CRT* capacity increase will create significant problems for the sale of *CRT*s, reason being the extremely shortage of materials, glass bulbs price increase due to capacity decrease. Screen capacity decrease by 15.9%, cone capacity reduced by 19.3%. Currently, the issue in which requires urgent resolution is how should *CRT* be developed from now on? How to limit production and protect prices? In order to keep profitability, the *CRT* market in 2007 should realize optimization of capacity and does not need to produce in large volume. Based on understanding, there are a few *LCD* lines starting to expand capacity. *32LCD* screen price reduced by 10%--comparing to the previous *34FS*, the price is even lower. Therefore, the suggestion is: while facing the

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worsening market of *Q1* in 2007 and the declined exports in Christmas 2006, and with next year's Chinese new year being later than usual, color tubes sales will have a longer slow season, the pressure on sales is significant, but, in *Q2* this year, some color tube companies dumped their color tubes with low prices, currently, the color television makers are still digesting these inventories, the impact is very bad. Therefore, it is recommended to the color tube makers to take more action on realistic issues for the sake of the customers and the market.

Agenda II: How to go into in-depth communication among the Color Tube Industry and together face the challenge of *Q4* 2006 and *Q1* 2007?

Chief Secretary Yang: As far as *Q4* 2006 and *Q1* 2007 market condition are concerned, how to have self-discipline in the industry? How to respond to *Q1* 2007 while maintaining *Q4* pricing,? Chief Secretary asked for comments from respective companies:

BMCC Heng Zhen: it is more difficult in *Q4* 2006, end of 2005 and beginning of 2006 around Chinese New Year. Production has been adjusted based on what was agreed upon. As far as the added capacities are concerned, how will respective makers collectively resolve this issue? Most important issue is that respective makers should categorize production types.

Samsung Ha: *Q4* 2006 will be over soon, what is more important is to focus on *Q1* 2007 condition. Samsung group's policy is to transfer business unit leaders each year at the beginning of each year, I hope I will not be responsible for the sales of color tubes of China next year. Based on internal information of Samsung, it is shown that 2010 China domestic *LCD* demand exceeded 20M. Currently, domestic *CTV* demand is less than 40M, domestic color tube capacity is over 70M. As to the publicly announced information, Chunghwa Picture Tubes converted 3 production lines, Samsung has no plan currently, I would like to listen to all of your opinion. As for the current supply and demand conditions, respective color tube makers should have mutual information exchanges for the profitability of the company and to jointly formulate a good plan. There is room for reduction on *LCD* cost, but *CRT* material costs are not optimistic. *CRT* industry should consider these elements: strengthen information communication for the overall industry chain. Based on *SDI* internal analysis, *CDT* price was reduced 14%, but the cost only reduced 3%. It is expected that *CPT* will face similar situation as *CDT*. Therefore, it is hereby suggested that makers should seek cooperation in pricing, and jointly resolve the issue of pricing on materials.

Shuguang Yang: In 2007, the company's business plan indicated that corresponding to the decrease in 2006, *Q1* 2007 cost should increase, it was estimated that the price will not be maintained. As for 2007

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Q1, when talking about production limits, gray inventory is very large, the reliability and accuracy of said data is yet to be verified. Based on understanding, some of the domestic major color television factories have heavy inventories, normal production can be maintained even if they did not make any purchases for two months.

Chief Secretary Yang: In October 2006, *CPT* production volume was 6.55Mpcs, what should be the production volume in January 2007 in order to satisfy the market, maintain the price and maintaining inventory?

Shuguang Yang: Large screen *LCD* price dropped, under 32 and 34, *CRT* will all be impacted and be pressured.

Samsung Ha: Q1 condition is worrisome, we need to resolve this during our meeting, whether we can sustain our prices until the end of the year requires industry to take proper measures.

Huafei Sheng: Facing the impact by *LCD*, the industry should reconsider the production limits to protect pricing as suggested before. At the same time of maintaining prices, whether it will provide more entry opportunities for the newly jointed makers, and under these circumstances, we should increase exports and resist imports. Q3 2006 industry price increase has brought opportunities for imports, long term consideration should be given as to how to get them to back out. Based on the experience from past years, production is usually greater than sales in the first half of the year, and the second half of the year would have sales greater than production. Based on past experience, respective color tube makers would convert line to speed up production, how should that be controlled?

Irico Sheng: Production limits—if the production is stopped, it will bring opportunities for the new *CPT* factories, how should the industry resist imports? Currently Irico is expanding exports, expecting to export 6M this year. Based on understanding, Northern Europe and Central Europe regions do not have any concept on flat screen yet, the main stream is still *CRTs*. *CRT* market allocation is 70%-80%, flat screen 20% or so. Based on understanding, Northern Europe has 24M *CRT* color television demands. Production limits and price limits are less probable in China. Prices would be loosen just because entering into a slow season, *CTV* makers know the trend and implemented price squeeze strategy. How can the industry have a healthy development? I would like to clarify, currently Irico *K* line has no production plan for the time being due to cost considerations. 28/29 inches will be produced on the old lines.

Thomson Han: Color tube makers are being sandwiched between the suppliers and the customers: the upstream materials continues to increase, downstream *CTV* factories are continually squeezing prices. If the production is limited to protect the price, it will provide opportunities for the newcomers and import tubes. Currently, there is no better way than limit production to cure the condition of oversupply. Dongguan factory ceased production 7 days in November, it is not because of lack of sales, and it was because we did not want to produce too much, hoping to control prices. Q1 2007 market is very tough, primary opportunity would be to export. Currently China region capacity is increasing, but capacity in other regions

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worldwide is decreasing. Based on understanding, Western Europe will have demands of 12M-15M next year, part of them will be supplied from China, also agreeable to limit production to protect the price.

Novel Sun: I suggest respective makers study the issues in the market report generated by the information collectors: 1. Provide resolution to respond to the issues for *Q4* 2006 and *Q1* 2007 market, the reason for increased inventories, and why is capacity being added? 2. How to resolve the issue on newly added capacity?

Chief Fan: Regarding EU's anti-dumping, the two makers being sued have already bankrupted. *CRT* production volume in Europe is 11M, among which Thomson has 6M, Samsung 5M, but the demands for Western Europe market is 15M, Russian market demand is 10M.

As for the anti-dumping suit for China's color tubes export to Europe has been dismissed (11/16), but the color television restriction has not been cancelled. If the color televisions are using color tubes from China, whether it is under the restriction is yet to be studied. Since *LCD*'s power consumption is three times as much as *CRT*, UK suggested to sell color television in different levels, and set *LCD* color television as level 3. As to the newly added capacity for Chunghwa and Changzhou Baoma, a strategy can be discussed to categorize them into types.

Xinjun Yang: Regarding to communicate with the newcomers in the industry, should we use conversational format?

Chief Secretary Yang: Changzhou Baoma infringed intellectual property; it is not possible for them to create impact for the industry. As for CPTF, the country was exporting all *CDT* made initially, now Fuzhou can do *CPT* business, and is a major shareholder of Huaxia, the industry hopes to be able to send representative to discuss with them and invite them into the industry to unify standards. Whether CPTM will decrease production, and do they have in-depth understanding of the impact on worldwide market? The reason for the trade differential came from Malaysia is that they shipped the tubes to China, and put them into a set for export, 12% tariff was applied.

Chief Fan, What changes are there for the capacity of CPTM?

Samsung Ha: According to my understanding, CPTM stopped one line, CPTF opened 3 lines, SDIM stopped 1 line in December.

Chief Secretary Yang: The purpose for this meeting is to hope that makers will not suffer a loss by the end of the year, I would suggest to use the strategy of production limitation to protect prices. As far as what was mentioned in the information collectors' report regarding newly added capacity, we will not consider Irico and Changzhou Baoma for the time being, and we will invite CPTF into the industry.

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Agenda III: What is the opinion from respective makers regarding inventory increases, what is your view on *Q1* 2007?

Xinjun Yang: Limit production to protect prices in *Q1* 2007, and reconsider total input volume for *Q1* market.

Chief Secretary Yang: Setup production based on sales and do not expand production blindly.

Irico Shen: I would suggest to stop production during Chinese New Year holiday period, with a win/win situation for the company and the employees.

Samsung Ha: Character of slow season: Oversupply, *CTV* factory gets large order (unit price for large order is dropped more than 5%), sign low price contract with *CPT* factory.

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If these types of large orders are accepted, sacrificing industry price will bring significant impact for industry development. When the industry operating environment is not favorable, *CTV* makers' will make harsher demands; for example, Changhong *VMI*'s payment method, such *VMI* methods may change payment due date which will severely impact the healthy development of the industry.

Agenda IV: How to deal with the trend of Q4 materials procurement?

Chief Secretary Yang:

Screen capacity reduced by 23.7%	Cone capacity reduced by 19.3%
Anci stopped 11 lines and started 14 lines	Anci stopped 4 lines
Xu Electronics stopped 2 lines	Changsha stopped 1 line
Shijiazhuang stopped 1 line	Shijiazhuang stopped 1 line
Total lines stopped 14, started 45	Total stopped 6 lines and started 19

Estimated total annual production of screens 96.44M, Cones production at 86.44M.

Copper price increased. *DY* price increased; especially for 21" it increased by US6. Although color tube price has increased, but in fact it was only converted into materials price ups, the tube itself did not have much profits.

Chief Secretary Yang: First of all, inventory has to be reduced to zero, and ultimately come to an appropriate reserved inventory. Currently, there are 5-6M extra capacity, and the entire industry shall consume this capacity by limiting production. It is recommended to cease production and limit production in order to ease the seriously oversupplied situation for color tubes in 2007, each maker shall consolidate its own condition and stop production for an accumulated 30 days for the whole year.

As to Chief Secretary Yang's recommendation, each has expressed comments as follow:

Novel Sun: Agreed.

Xinjun Yang: Voluntarily reduce capacity, follow the rules of the game, and agree with Chief Secretary's recommendation.

BMCC Heng Zhen: Support the healthy development of the industry as a priority, agree to Chief Secretary's proposal to invite CPTF into the industry. In addition, it is hoped that each company would try to increase export volume, but would need to understand the composition of the current import data of 11M.

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Samsung Ha: The decision to completely stop production is out of his authority, it is to be determined.

Shuguang Yang: Need to be confirmed.

Huafei Sheng: Based on market condition, respective companies shall initialize active and flexible strategy in stopping production; since by stopping production blindly brings significant impact on any company, it can be based on model types and consolidated golden week/summer vacation types of methods to confirm the condition of stopped production.

Irico Yao: Agreed to limit production, and agrees with Huafei's suggestion. Proposed to immediately implement limited production and stop production in *Q4*. As far as Fuzhou, he agreed to Chief Secretary Yang's recommendation, as far as CPTM exported to China close to 6M color tubes, he is considering whether there exists a anti-dumping issue.

Chief Secretary Yang: Material prices are increasing, especially the foreign materials factories, this is a disadvantage to CPTM. Currently, the entire *CRT* industry focus is on China. Domestic cost has the most competitive edge, if the domestic factories suffer losses, the foreign factories for sure will lose money. Therefore, it is proposed to each company accumulatively stop overall production for 1 month, and take up industry monitoring mechanism.

Chief Fan's proposal resolution draft: detailed in *WORD* document.

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2006 年彩管行业总经理会议会议纪要

会议时间：2006 年 11 月 21 日

会议地点：上海 华夏宾馆

与会单位及人员：

北京松下 范文强 横枕光则 李大林 迟永纯 卢丽曼 黄海

咸阳彩虹 中小琳

赛格日立 杨国钧 贾建民 郭鹏

长沙曙光 杨亚平 冯靖

LPD 韩在琯 卢滢元 丁江南

南京华飞 盛建忠 张德柱 许明晖

上海永新 孙伟 李雷 叶青

三星 SDI 河侯穆 李昌焕 谢云 文静

汤姆逊 韩达德 辛鹏

新骏 杨向杰 王志伟

主要内容：

杨秘书长主持，致开幕词。

范会长致辞：这次总经理会议是一次关键的会议，大家在此研讨明年的市场形势，力求稳定环境，寻求行业健康发展。

议题一：信息员代表汇报当前彩电彩管行业现状及今后市场的预测（详见 PPT）。

杨秘书长：针对信息员的汇报，提出如下意见：以后的市场汇报应增加平板彩电市场对 CRT 彩电的冲击分析；07 年 CRT 产能增加，会对 CRT 销售产生重大问题，原因在于材料奇缺，玻壳因产能下降而涨价。屏的产能下降 15.9%，锥的产能下降 19.3%。现在急需解决的问题，CRT 今后该如何发展？如何限产保价？为了保持利润，在 07 年的 CRT 市场应实现产能最优化而不需大量生产。据了解，目前有几条 LCD 线上马，产能扩大。32LCD 屏价格下降 10%，与以前 34FS 相比，价格还要便宜。因此，建议面对 07 年 Q1 市场恶化，06 年圣诞节出口萎缩的局面，明年春节比较晚，彩管销售淡季较长，销售压力很大。但是，今年 Q2 有些彩管企业低价抛售的彩管，现在彩电厂还在消化这些库存，影响很不好。所以，建议各彩管厂家为了客户和市场多做一点实事。

议题二：彩管行业如何深入沟通协作，共同迎战 06 年 Q4 和 07 年 Q1

杨秘书长：针对 06 年 Q4 和 07 年 Q1 的市场情况，行业如何自律？维持 Q4 的价格，如何应对 07 年 Q1？请各个公司发表意见。

北松 横枕：06 年 Q4 比较困难。05 年年底和 06 年年初春节前后，已按约定调整生产。对于新增生产能力，各家如何联合解决此问题。最重要的一点是，各家尽量区分生产品种。

三星 河：06 年 Q4 即将过去，更重要是关注 07 年 Q1 的情况。三星集团规定每年年初事业部门领导调任，我希望明年不再负责中国彩管销售任务。据三星内部资料显示，2010 年中国国内 LCD 需求超过 2000 万。目前国内 CTV 需求在 4000 万以下，国内彩管产能在 7000 万以上。针对刚发表市场资料，中华映管改造 3 条生产线，三星暂时没有方案，想听听各家的意见。针对目前供求关系情况，各彩管厂家应互相交流信息，为求公司利润，共同谋划好的方案，LCD 在成本上有下降的空间，而 CRT 资材价格不容乐观，CRT 行业应考虑此方面因素，加强整个产业链的信息沟通。据 SDI 内部分析，CDT 价格下降 14%，而成本仅下降 3%，预计 CPT 将出现与 CDT 类似情况。因此，建议各家在价格方面寻求合作，共同解决材料价格问题。

曙光 杨：07 年公司事业计划相对 06 年有下降，07 年 Q1 成本上涨，预计不能保价，针对 07

年 Q1, 谈限产问题, 灰色库存很大, 这个数据的可靠性和准确性需要再考究。据了解, 国内一些大彩电厂库存大, 即使两个月不采购, 也可维持正常生产。

杨秘书长: 06 年 10 月份 CPT 产量 655 万只, 07 年 1 月份产量应为多少才能满足市场, 保价保库存?

曙光 杨: 大屏幕 LCD 价格下降, 32 34 以下 CRT 都会受到冲击, 受到积压。

三星 河: 担心 Q1 的情况, 我们开会需要解决, 我们是否可以把价格挺到年底, 需要行业措施。

华飞 盛: 面对 LCD 的冲击, 提议的限产保价措施, 行业需要重新思考一下, 保价的同时是否给新入行者更多机会增加了进口, 在此情况下, 我们应增加出口, 抵挡进口。06 年 Q3 行业涨价给进口带来了机会, 如何让其退出, 应做长远的考虑。根据往年的经验, 上半年是产大于销, 下半年销大于产。按以往经验, 各彩管厂会改造提速。如何控制?

彩虹 申: 限产——如果停产会给新增 CPT 厂带来机会, 行业应如何抵制进口? 彩虹目前扩大出口, 预计今年出口 600 万。据了解, 北欧 中欧地区消费者对平板无概念, 主流还是 CRT, CRT 市场份额 70%-80%。平板 20%左右。据了解, 北欧市场有 2400 万 CRT 彩电需求。中国限产限价可能性小, 因为刚进入淡季, 价格就有所松动, CTV 厂家掌握了动向, 实行了压价策略。行业应如何健康发展? 澄清一下, 日前彩虹 K 线因考虑成本原因, 暂无生产计划。28/29 英寸在老线上生产。

汤姆逊 韩: 彩管厂正处于供应商与客户夹缝之间, 上游材料在不断涨价, 下游 CTV 厂在不断压价。如果限产保价, 会给新加入者和进口管机会。日前供大于求的情况, 不采取限产, 也没有更好的办法。东莞工厂 11 月停产 7 天, 不是因为卖不出去, 而是不想生产太多, 希望控制价格。07 年 Q1 市场很困难, 主要机会是出口。目前中国地区产能在增加, 而全球其它地区产能在减少。据了解, 明年西欧的需求在 1200-1500 万, 部分来自中国, 对于限产保价表示赞同。

永新 孙: 建议各家对信息员的市场汇报提出的问题进行探讨: 一 针对 06 年 Q4 07 年 Q1 市场提出解决问题的相应对策, 库存增加原因, 为什么新增产能? 二 如何解决新增的产能?

范会长: 针对欧盟反倾销, 起诉的两家已经倒闭, 欧洲 CRT 产量有 1100 万, 其中汤姆逊 600 万 三星 500 万, 而西欧市场需求 1500 万, 俄罗斯市场需求 1000 万。

有关中国彩管出口欧洲的反倾销已经撤消 (11/16), 但是对彩电的限制还没有取消。如果彩电来自中国彩管, 是不是还是受到限制, 还需要研究。鉴于 LCD 能耗是 CRT 的三倍, 英国建议彩电进行分级销售, 将 LCD 彩电定于三级。针对新增产能中华映管和常州宝马, 实行分品种协商策略。

新骏 杨: 针对行业的新加入者, 是否采用对话形式。

杨秘书长: 常州宝马因侵犯知识产权, 对行业不可能造成影响。福州中华, 当初国家全部外销, 做 CDT。现在福州可以做 CPT 业务, 又是厦华的大股东。行业希望能够派代表与他们协商, 邀请其入行, 统一规范。华映马来西亚是否会减产, 对全球的影响应深入了解? 贸易逆差来自于马来西亚的原因, 他们出口管子到中国, 再作成整机再出口, 要收取 12% 的关税。

范会长: 华映马来西亚有什么产能上的变化?

三星 河: 据了解, 华映马来西亚停 1 条线, 中华福州开 3 条线。三星 马来西亚 12 月份停 1 条线。

杨秘书长: 本次会议的目的是希望各家在年底不亏损, 建议采取限产保价的策略。

对于信息员报告中提到新增的产能, 目前可不考虑彩虹和常州宝马。中华福州邀请其入行。

议题三: 针对库存上升, 07 年 Q1, 请各家提提看法?

新骏 杨: 07 年 Q1 限产保价, 对于 Q1 市场整体投放量, 需再整体考虑。

杨秘书长: 以销定产, 不盲目扩大生产。

彩虹 申: 建议春节期间停产, 来限产保价, 给公司和员工带来双赢的局面。

三星 河: 淡季特点: 供大于求, CTV 厂拿大单 (大单价格下降 5% 以上) 与 CPT 厂低价签定合

同。如果接受此类大单，牺牲行业价格，将会给行业发展带来很大影响。同行业经营环境不善，CTV 厂家要求越来越苛刻，例如长虹 VMI 结算方式，这些例如 VMI 方式或者变更付款期限，都严重影响了行业的健康发展。

议题四：如何针对 Q4 材料采购形势？

杨秘书长：

屏产能下降 23.7%	锥 产能下降 19.3%
安彩停 11 条 开 14 条	安彩停 4 条
旭电子 停 2 条	长沙停 1 条
石家庄 停 1 条	石家庄停 1 条
共计停 14 条 开 45 条	共计停 6 条开 19 条

预计全年屏生产 9644 万，锥生产 8644 万。

铜价格上涨。DY 价格上涨，尤其是 21 上涨 6 个美金。彩管虽然涨价，其实只是转移到材料涨价，本身没有赚多少钱。

杨秘书长：首先要作到无库存，然后作到适当的储备库存。目前多余的 500-600 万产能，整个行业采取限产方式把它消耗掉。建议为了缓和 2007 年彩管严重供大于求的局势，会议提议停产限产，每家结合自身情况全年整体停产累计 30 天。

对于杨秘书长的建议，各家表态：

永新 孙：表示赞同。

新骏 杨：主动将产能降低，遵守游戏规则，赞同秘书长的意见。

北松 横枕：首先支持行业的健康发展，对于秘书长提出的邀请中华福州入行表示赞同。另外，希望各公司尽量增加出口，针对目前的进口数据 1100 万，需要了解一下构成。

三星 河：完全停产超过他的决策范围，待定。

曙光 杨：需要再确定。

华飞 盛：根据市场情况，各公司采取主动灵活的停产策略，因为任何公司盲目的停产影响很大，可根据品种和结合黄金周/复假等方式来确定停产情况。

彩虹 姚：对于限产表示赞同，同意华飞的建议。提议 Q4 马上实施限产 停产。对于福州的事宜，赞同杨秘书长的建议，针对中华马来西亚出口到中国将近 600 万的彩管，是否考虑存在反倾销问题。

杨秘书长：现在材料涨价，尤其是国外的材料工厂，这个对中华马来西亚不利，目前整个 CRT 产业的重心在中国。国内成本最具有竞争力，如果国内亏损，国外厂家一定亏损。所以提议全年各个公司累计整体停产 1 个月。并采取行业监督机制。

范会长的提议的决议草案，详细 WORD 文件。